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FEEDING HABITS AND FOOD OF THE FISHES OF MISSISSIPPI SOUND AND ADJACENT COASTAL AREAS; A BIBLIOGRAPHY WITH ABSTRACTS

by

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Final Report

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Mobile, Ala. 36628

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This document presents bibliographic material relevant to fish feeding habits in the Mississippi Sound and adjacent areas. This bibliography is comprised of 33 references with abstracts or annotations which contain information on Predator-Prey interactions and feeding strategies related to life history parameters. ↗		

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PREFACE

This document was prepared for the Mississippi Sound and Adjacent Areas Study conducted in part by the U. S. Army Engineer Waterways Experiment Station (WES) for the U. S. Army Engineer District, Mobile. WES activities in the project were authorized by Intra-Army Order No. FC-81-0020 dated 25 November 1980.

This bibliographic document together with a companion bibliography comprise the preliminary products of an investigation to describe the ecological role of the invertebrate macrobenthos of Mississippi Sound and adjacent coastal habitats. The results of the study will be used for planning dredging and dredged material disposal operations in the Mobile District.

This document was prepared by Dr. Douglas G. Clarke and Mr. Harry L. Horstmann, Environmental Systems Division (ESD), Environmental Laboratory (EL), WES. Dr. Andrew C. Miller, ESD, assisted with computer software development. Work progressed under the general supervision of Dr. Thomas D. Wright, Chief, Waterways Habitat and Monitoring Group, ESD, EL; Mr. Bob O. Benn, Chief, ESD; and Dr. John Harrison, Chief, EL.

COL Nelson P. Conover, CE, and COL Tilford C. Creel, CE, were Commanders and Directors of WES during the conduct of this work. Technical Director was Mr. Fred R. Brown.

This report should be cited as follows:

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FEEDING HABITS AND FOOD OF THE FISHES OF MISSISSIPPI
SOUND AND ADJACENT COASTAL AREAS;
A BIBLIOGRAPHY WITH ABSTRACTS

1. This document presents bibliographic material relevant to studies of trophic interrelationships within ichthyofaunal communities of Mississippi Sound and its adjacent coastal areas. A very limited amount of research has been conducted on food habits of fishes in the subject areas. The bibliography, therefore, consists largely of references which describe studies in other geographical areas. An attempt was made by the bibliography's compilers to include pertinent references on taxa closely related to the subject ichthyofauna and on similar estuarine and continental shelf systems. A number of the 83 references listed herein deal with specialized topics such as: (a) effects of fish predation on benthos, (b) feeding strategies as related to life history parameters, and (c) effects of competition of food habits.

2. Most citations are accompanied by the complete author abstracts. Where the limitations in capacity of the computerized information handling and printing system used to produce this document precluded inclusion of an entire abstract, the abstract was truncated. Papers which contained no abstracts or appropriate summary sections were annotated. Annotations and truncated abstracts are indicated by an asterisk at the end of the citation.

3. The bibliographic material presented herein is not intended to be a comprehensive treatment of the literature on trophic interrelationships of fishes. Rather, it is a supplemental updating of the literature on this topic as it pertains to Mississippi Sound and adjacent areas. Users should consult the sources listed below for more generalized literature reviews. A number of the references cited in these sources are included herein to facilitate searches by workers interested solely in the topic of fish food habits.

Christmas, J. Y. and R. S. Waller. 1973. "Estuarine Vertebrates, Mississippi," in J. W. Christmas (ed.), Cooperative Gulf of Mexico Estuarine Inventory and Study, Mississippi, Phase IV, Biology, pp 320-406, Gulf Coast Research Laboratory, Ocean Springs, Miss.

Swingle, H. W. 1971. "Biology of Alabama Estuarine Areas-- Cooperative Gulf of Mexico Estuarine Inventory," Ala. Mar. Res. Bull., 5:1-123.

U. S. Army Corps of Engineers Contract Report. 1978. "Literature Review of Mississippi Sound and Adjacent Area," Mobile District, CE, Contract No. DACW1-78-C-0244, 251 pp.

4. This report and a companion bibliography on macrobenthic communities (with emphasis on animal-substrate interactions and secondary production) are products of a study that will analyze the trophic support potential of Mississippi Sound and adjacent areas' benthic infaunal communities for demersal bottom-feeding fishes. The results of these analyses will be the substance of a future report.

ALTON, M.S.

NO. 81
1973 BERING SEA BENTHOS AS A FOOD RESOURCE FOR DEMERSAL FISH POPULATION
HOOD & KELLY (EDS) OCEANOGRAPHY OF THE BERING SEA: 257-277
UNIV ALASKA, INST MAR SCI FAIRBANKS, AK

CERTAIN BENTHIC ANIMALS SUCH AS THE TANNER AND KING CRABS, PANDALID SHRIMP AND MOLLUSKS ARE OF DIRECT IMPORTANCE TO MAN; OTHER ORGANISMS ASSOCIATED WITH THE BOTTOM OF THE BERING SEA COMPETE WITH OR PREY UPON ANIMALS OF USE TO MAN. MANY MEMBERS OF THE MACROBENTHOS, HOWEVER, PROVIDE A NUTRITIONAL BASE FOR BENTHOS AND CRUSTACEANS OF COMMERCIAL IMPORTANCE OF THE BENTHOS IS HIGHEST IN THE WESTERN AND NORTHERN PARTS OF THE SHELF REGION, REACHING A MAXIMUM AVERAGE FIGURE OF $9056/m^2$ IN THE CHIRIKOV BASIN THE LOWEST VALUE IS $556/m^2$ FOR THE BROAD SHELF REGION OF THE SOUTHEASTERN BERING SEA, WHERE MAJOR FISHERIES TAKE PLACE. IN TOTAL BIOMASS BY REGION, THE CHIRIKOV BASIN ALONE HAS AN ESTIMATED 40.5 MILLION METRIC TONS, OR ALMOST TWICE THAT OF THE WESTERN BERING SEA. THE NORTHERN BERING SEA, IN FACT, ACCOUNTS FOR 80 PERCENT OF THE TOTAL BENTHOS BIOMASS OF THE SHELF REGION. IN THE SOUTHEASTERNSCTOR, WHERE OVER ONE MILLION METRIC TONS OF BOTTOM FISH HAVE BEEN REMOVED ANNUALLY IN RECENT YEARS, THE AMOUNT OF BENTHOS IS LESS THAN 10 PERCENT OF THE ESTIMATED TOTAL FOR THE BERING SEA. THE DISTRIBUTION OF THE FOOD BENTHOS PARALLELS SOMEWHAT THAT OF THE TOTAL BIOMASS, BUT THE PROPORTION OF FOOD BENTHOS TO TOTAL BENTHOS IS HIGHEST (OVER 50 PERCENT) IN THE GULF OF ANADYR AND THE SOUTHEASTERN SHELF REGION. THE WESTERN BERING SEA LACKS A DEVELOPED FOOD BENTHOS BUT IS EXCEEDINGLY RICH IN EPIBENTHIC ANIMALS SUCH AS SAND DOLLARS, BARNACLES, SEA ANEMONES, AND SPONGES.

TOTAL ESTIMATE OF FOOD BENTHOS IN THE BERING SEA (64 MILLION METRIC TONS), ONLY 17 PERCENT (OR 11 MILLION METRIC TONS) ARE ACCESSIBLE TO COMMERCIAL CONCENTRATIONS OF DEMERSAL FISH BECAUSE OF THE COLD TEMPERATURES THAT PREVAIL IN MANY PARTS OF THE SEA. IT APPEARS THAT THESE TEMPERATURE BARRIERS LIMIT THE BOTTOM FEEDING FISH FROM INVADING THE RICHLY CONCENTRATED BENTHOS OF THE NORTHERN REGIONS. ALTHOUGH THE BENTHOS PLAYS SOME PART IN SUPPORTING FISH POPULATIONS, IT MUST BE VIEWED WITHIN THE TOTAL FRAMEWORK OF THE NUTRITIONALEPENDENCE OF THE DEMERSAL FISHES ON THE NEKTON AND PLANKTON AS WELL.

ARNTZ, W.E.

NO. 66
PREDATION BY DEMERSAL FISH AND ITS IMPACT ON THE DYNAMICS OF
MACROBENTHOS
TENORE & COUL (EDS) MAR BEN DYN, UNIV. S.C. PRESS: 121-149

SINCE 1968, INVESTIGATIONS HAVE BEEN CARRIED OUT IN THE WESTERN BALTIc ON INTER-RELATIONSHIPS OF THE DYNAMICS OF MACROBENTHOS AND DEmersal FISH. THESE STUDIES HAVE INVOLVED: 1) INVESTIGATIONS OF OVER 5,000 STOMACH & GUT ANALYSES TO QUANTIFY THE FOOD (INCLUDING SEASONAL CHANGES) OF COD, WHITING, DAB, PLAICE, FLUNDER & SOME LESS IMPORTANT FISH SPECIES; 2) SURVEY OF INFAUNAL MACROBENTHOS OVER EIGHT YEARS (1968-1971 & 1975-1978); & 3) A THREE-YEAR EXPERIMENTAL STUDY ON DYNAMICS & PRODUCTION OF MACROBENTHOS AT THE "BENTHOSGARTEN" STATION. THIS PAPER ALSO INCLUDES FISH DATA PUBLISHED ANNUALLY BY THE INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA & FROM OTHER STUDIES CARRIED OUT IN KIEL BAY. THE INTERACTION OF MACROBENTHOS & DEMERSAL FISH IS DISCUSSED, PARTICULARLY REGARDING THE EFFECTS OF SELECTIVE PREDATION DIFFERENCES IN PREDATION INTENSITY FROM YEAR TO YEAR, RESULTING IN REDUCED POPULATION LEVELS OF MACROBENTHOS. WE'RE OBSERVED, BUT THE LONG-TERM DYNAMICS OF THE MORE IMPORTANT BENTHIC FOOD SPECIES IN THE WEST BALTIC WERE SEEMingly NOT INFLUENCED BY THE YEAR CLASS STRENGTH OF DEMERSAL FISH. LIkewise, THE YEAR CLASS STRENGTH OF BENTHOS IN DIFFERENT YEARS DID NOT AFFECT THE SIZE AND PRODUCTION OF THE DEMERSAL FISH STOCKS ON THE AREA. A NUMBER OF POSSIBLE REASONS FOR THIS APPARENT LACK OF CORRELATION ARE DISCUSSED.

BAKER-DITTRUS, A.M.
1978 NO. 17
FORAGING PATTERNS OF THREE SYMPATRIC KILLIFISH
COPEIA 1978(3): 383-389.

THREE SYMPATRIC KILLIFISH, *FUNDULUS MAJALIS*, F. HETEROCLITUS & F. *DIAPHANUS* (CYPRINODONTIDAE), USE A WIDE VARIETY OF FOOD ITEMS & THEIR DIETS OVERLAP. DIET OVERLAP INCREASES WITH INCREASING FOOD ABUNDANCE DURING PERIODS OF HIGH FOOD ABUNDANCE THE SPECIES CO-OCCUR IN HIGH DENSITIES WHEREAS DURING PERIODS OF LOW FOOD ABUNDANCE 1 SPECIES PREDOMINATES.

BASS, R. J. AND J.W. AVAULT JR.

NO. 15

FOOD HABITS, LENGTH-WEIGHT RELATIONSHIP, CONDITION FACTOR, AND
GROWTH OF JUVENILE RED DRUM, *SCIAENOPS OCELLATA*, IN LOUISIANA
TRANS AM FISH SOC 104(1): 35-45.

FOOD HABITS OF 568 JUVENILE RED DRUM, *SCIAENOPS OCELLATA*,
(CLINNAEUS), RANGING FROM 8.0 TO 183.0 MM STANDARD LENGTH, WERE
DETERMINED DURING THE TIME THE FISH UTILIZED A LOUISIANA SALT
MARSH AS A NURSERY AREA. POTENTIALLY AVAILABLE FOOD ORGANISMS WERE
SAMPLED DURING THE 7-MO STUDY. SOME DEGREE OF SELECTIVITY BY
JUVENILE RED DRUM WAS DEMONSTRATED, BUT GENERALLY THE MOST ABUN-
DANT ORGANISMS OF AN EDIBLE SIZE WERE UTILIZED. MOST HEAVILY
CHANGED IN FOOD WITH INCREASING SIZE CAN BE DESCRIBED IN THREE
PHASES: 1) RED DRUM LESS THAN 15 MM ATE ZOOPLANKTON; 2) BETWEEN 15
MM & 75 MM THE RED DRUM ATE MOSTLY SMALL BOTTOM INVERTEBRATES &
THE YOUNG OF OTHER FISH; 3) RED DRUM LARGER THAN 75 MM ATE DECAPOD
(CRABS & SHRIMP) & FISH. SOME DIFFERENCES BETWEEN DAY & NIGHT
FEEDING WERE FOUND. FOR RED DRUM 65 TO 85 MM THE DOMINANT FOOD
EATEN WAS GRASS SHRIMP DURING THE DAY, WHEREAS AT NIGHT IT WAS
FISH. THE LENGTH-WEIGHT RELATIONSHIP WAS $\log w = -7.2052 + (4.1913)$
(LOG L); THE AVERAGE COEFFICIENT OF CONDITION WAS 1.969 & AVERAGE
GROWTH PER MONTH RANGED BETWEEN 13.3 & 25.6 MM DURING THE STUDY
PERIOD.

BELLINGER, J.W. AND J.W. AVAULT JR.
NO. 25
1971. FOOD HABITS OF JUVENILE POMPANO, TRACHINOTUS CAROLINUS, IN
LOUISIANA
TRANS AM FISH SOC 100(3): 486-494.

FOOD HABITS OF JUVENILE POMPANO (*TRACHINOTUS CAPOLINUS*) IN LOUISIANA WERE DETERMINED DURING THE SUMMER OF 1968. STOMACHS OF 899 JUVENILES WERE EXAMINED FROM STATIONS AT GRAND ISLE & HOLLY BEACH, LOUISIANA; THE FISH RANGED FROM 10 TO 125 MM IN TOTAL LENGTH. PERCENT FREQUENCY OF OCCURRENCE IN DIET WERE DETERMINED. JUVENILE VOLUME, & SEASONAL VARIATION IN DIET WERE DETERMINED. POLYCHAETS, SMALL CLAMS, GASTROPOD LARVAE, FORAMINIFERA IN LOUISIANA, AMPHIPODS, AMPHIPODS, MYSIDS, ISOPODS, BRACHYURANS (JUVENILES, MEGLALOPS, & COPEPODS, CRABS), BRACHYURANS (JUVENILES, MEGLALOPS, & COPEPODS, CRABS). SMALL JUVENILES APPEARANTLY FEEDING ON THOSE ORGANISMS MOST ABUNDANT AT THE TIME LARGER JUVENILES ATE A MORE LIMITED DIET, CONSISTING PRIMARILY OF COQUINA CLAMS.

BENNETT, J.A.

NO. 13
1973. FOOD HABITS AND FEEDING CHRONOLOGY OF THE LONGNOSE KILLIFISH
FUNDULUS SIMILIS (BAIRD AND GIRARD) FROM ST. LOUIS BAY, MISS.
M.S. THESIS, DEPT. OF ZOOLOGY, 32PP.

FUNDULUS SIMILIS, THE LONGNOSE KILLIFISH, WAS AN ABUNDANT PERMANENT RESIDENT ALONG THE SHIFTING SAND BEACHES OF THE ST. LOUIS BAY ESTUARINE AREA. STOMACH CONTENTS WERE ANALYZED FROM FISH COLLECTED FROM JUNE 1971-NOVEMBER 1972 CONSIDERING DIEL, SEASONAL, & SIZE CLASS INFLUENCES. THE YOUNG FED PRIMARY ON AMPHIPODS & MYSID SHRIMP AT ABOUT 32 MM S.L. DIETARY PREFERENCES SHIFTED MORE TOWARD AMPHIPODS WHICH REMAINED THE MOST IMPORTANT FOOD SOURCE AFTER ATTAINING THIS SIZE. THE LARGE INCIDENCE OF AMPHIPODS CONTRIBUTED GREATLY TO THE PROMINENCE OF THE CRUSTACEAN AS A GROUP MOST IMPORTANT IN OCCURRENCE & VOLUME. THE PRIMARY BREAKDOWN OF FOOD ITEMS IS: AMPHIPODS 51%; OSTRACODS 6%; MYSIDACEA 5%; PALAEMONIDAE 5%; COPEPODA 1%; SEDIMENT 12%; ANNELIDA (POLYCHAETES) 1%; DIPTERA 5%; HYMENOPTERA 3%; & COLEOPTERA 1%. STOMACH CONTENT ANALYSIS INDICATED THAT FEEDING OCCURRED FROM ABOUT DAWN UNTIL DUSK, WITH A BREAK IN FEEDING OCCURRING IN THE EARLY AFTERNOON. THE STOMACHS OF FISH COLLECTED FROM 2-3 HOUR AFTER DARK UNTIL DAWN SHOWED A MARKED INCREASE IN THE NUMBER OF EMPTY STOMACHS & PROGRESSIVE EMTINESS OF THE ENTIRE DIGESTIVE TRACT. AMPHIPODS OCCURRED IN THE HIGHEST PERCENTAGE VOLUMES DURING ALL SEASONS EXCEPT SUMMER WHEN MYSID SHRIMPS PREDOMINATED. POLYCHAETES EXHIBITED THE SECOND HIGHEST PERCENTAGE VOLUMES IN ALL SEASONS EXCEPT WINTER WHEN THE TERRESTRIAL INSECTS (DIPTERANS & HYMENOPTERANS) INCREASED CONSIDERABLY. A SHORT DISCUSSION OF THE FOOD ITEMS OF THE PREY SPECIES INVOLVED INDICATES THAT *FUNDULUS SIMILIS* SERVES AS AN INTERMEDIATE STEP BETWEEN DETRITUS-ALGAE CONSUMERS & TOP CARNIVORES.

BERG, J.

NO. 59
1979. DISC. OF METH. OF INVESTIGATING FOOD OF FISHES, WITH REF. TO A
PRELIM. STUDY OF PREY OF GOBIUSCULUS (GOBIIDAE)
MAR BIOL 50: 263-273

THE VALIDITY, RELIABILITY & PRACTICABILITY OF DIFFERENT METHODS FOR THE INVESTIGATION OF STOMACH CONTENTS OF A SMALL, PLANKTON-EATING FISH ARE DISCUSSED. TESTS DEMONSTRATED THE PROBLEMS RELATED TO MASS & VOLUME MEASUREMENTS OF PLANKTONIC FOOD. SEVERAL "FREQUENCY OF OCCURRENCE" NUTRITION INDICES, PARTICULARLY HYNES'S INDEX AND SHORGIN'S INDEX, ARE CRITICIZED. A LOGARITHMIC VERSION FOR IVLEV'S FOOD SELECTION INDEX, A PROPOSED AS A REPLACEMENT FOR IVLEV'S STUDY ON THE FOOD OF GOBIUSCULUS FLAVESCENS (FABRICIUS), SAMPLED IN JULY, 1975 AT HELGOLAND, PROVIDES SOME NUMERICAL INFORMATION ON THE COMPOSITION OF ITS STOMACH CONTENTS & FOOD PREFERENCE.

BOOTHBY, R.N. AND J.W. AVAULT JR.
1971. NO. 16
FOOD HABITS, LENGTH-WEIGHT RELATIONSHIP, AND CONDITION FACTOR OF
THE RED DRUM (*SCIAENOPS OCELLATA*) IN SOUTHEASTERN LOUISIANA
TRANS AM FISH SOC 100(2): 290-295.

A TOTAL OF 349 ADULT RED DRUM (*SCIAENOPS OCELLATA*) WERE COLLECTED FROM THE COASTAL MARSH BELOW HOPEDALE IN SOUTHEASTERN LOUISIANA, BETWEEN OCTOBER 1967 & OCTOBER 1968. A TOTAL OF 286 FISH (82%) CONTAINED IDENTIFIABLE FOOD ITEMS WHICH WERE ANALYZED AS TO FREQUENCY OF OCCURRENCE & PERCENT OF TOTAL VOLUME. THE MAIN FOOD ITEMS IN ORDER OF OCCURRENCE WERE FISH, SHRIMP, & CRABS. BLUE CRABS, MUD CRABS, & PENAEID SHRIMP WERE THE CRUSTACEANS MOST FREQUENTLY EATEN, & AT LEAST 14 DIFFERENT SPECIES OF FISH WERE UTILIZED TO SOME DEGREE. FOOD HABITS VARIED SUBSTANTIALLY FROM SEASON TO SEASON. FISH WAS THE MAIN FOOD ITEM DURING WINTER & SPRING MONTHS. CRABS & SHRIMP COMBINED COMPRISED THE BULK OF THE DIET DURING THE SUMMER & FALL MONTHS. ONLY SLIGHT DIFFERENCES IN FOOD HABITS WERE DETECTED DUE TO SIZE OR SEX. GONADAL EXAMINATION OF EIGHT ADULTS INDICATED THAT SPawning TOOK PLACE BETWEEN SEPTEMBER & DECEMBER. THE LENGTH-WEIGHT RELATIONSHIP & SEASONAL CONDITION VALUES WERE DETERMINED. RED DRUM OF A GIVEN STANDARD LENGTH WERE GENERALLY HEAVIER THAN PREVIOUSLY REPORTED. CONDITION VALUES FROM THIS STUDY REPRESENTED FISH IN OVERALL GOOD CONDITION.

BOSTON, S.A.

NO. 14
271 STUDIES ON THE BIOLOGY OF THE SAND PERCH, DIPLECTRUM FORMOSUM
(PERCIFORMES: SPERANIDAE)

TECH SERIES, DEPT OF NATURAL RESOURCES, FL, 65:1-27

BIOLOGY OF THE HERMAPHRODITIC SPERANID, DIPLECTRUM FORMOSUM, WAS STUDIED DURING 1969 IN THE NORTHERN GULF OF MEXICO. THE SPECIES WAS TRANSFERRED FROM NORTH CARPOLINA TO URUGUAY & THROUGHOUT THE GULF OF MEXICO. IN THE NORTHERN GULF THE SPECIES COMMONLY OCCURS AT DEPTHS OF 50' OR LESS, OVER SAND BOTTOM AT THE BASE OF LOW-LYING REEFS OR OTHER BOTTOM FORMATIONS. THE SPECIES DOES NOT TOLERATE COLDER WATER. OTHER MOLE SPECIES FOUND APPROXIMATELY AT THE ONSET OF WINTER. SALINITIES AT WHICH THE FISH CAN SURVIVE ARE UNKNOWN. DIPLECTRUM FORMOSUM IS ASSOCIATED WITH DIVERSITY OF COMMUNITIES OF THE GULF. MAXIMUM AGE DETERMINED BY WEIGHT RELATION WAS 6 YEARS; MAXIMUM SIZE WAS 30.4 CM. DIPLECTRUM FORMOSUM IS MODERATELY PREDOMINANT IN THE SECON & THIRD YEARS OF LIFE. OCCURRING BETWEEN THE LATE SPRING & SUMMER. THE BOTTOM CAN BE COMPRESSED BY WEIGHT. DIPLECTRUM FORMOSUM OCCURS IN SHALLOW WATER. THE SPECIES IS SYNCHRONOUS HERMAPHRODITISM. 223 MM LENGTH SPECIMEN OCCURRED IN A 23 MM SLICK. IN DIET, NO EVIDENCE TO INDICATE THE SPECIES GOES SELF-FERTILIZATION. ANALYSIS OF THE DIET INDICATED THAT CRABS MADE UP A LARGE PORTION OF THE DIET. AMPHIPODS WERE SHRIMP & CRABESSES. SMALLER FISH CONSUMED GREATERLY IMPORTANT FOR SMALLER FISHES. THE SPECIES TENDS TO SET UP HOME AREAS IN WHICH IT CARRIES OUT ITS LIFE ACTIVITIES. IT ALSO SHOWS A DAILY ACTIVITY PATTERN WHICH HAS BEEN SUBSTANTIATED BY LABORATORY EXPERIMENTS. CHANGES IN COLOR ARE DUE TO PRESERVATION, ACTIVITY & GROWTH.

BROOK, I. M.

1977 NO. 58
TROPHIC RELATIONSHIPS IN A SEAGRASS COMMUNITY IN CARD SOUND, FLA.
FISH DIET IN RELATION TO MACROBENTHIC AND CRYPTIC FAUNAL ABUND.

TRANS AM FISH SOC 106(3): 219-229.

SEAGRASS COMMUNITIES ARE A MAJOR FEATURE OF SHALLOW MARINE AREAS THROUGHOUT THE WORLD. THE MARINE SPERMATOPHYTE THALASSIA TESTU DITUM IS THE DOMINANT SEAGRASS IN SOUTHEAST FLORIDA & THE GULF COAST. THE TROPHIC INTERACTION BETWEEN THE FISHES & THE MACROBENTHIC & CRYPTIC FAUNA FOUND IN THE AREA WAS EXAMINED BASED ON DIGESTIVE TRACT ANALYSIS. THE PRINCIPAL INTERACTION BETWEEN THE PRIMARY CONSUMERS OF THE STUDY AREA & THE HIGHER TROPHIC LEVEL PREDATORS WAS VIA THE POLYCHAETES & PERACARIDIAN CRUSTACEANS. THE MOLLUSKS WHICH CONTRIBUTED SIGNIFICANTLY TO THE BENTHIC BIOMASS WERE NOT A PREFERRED FOOD FOR THE ANIMALS FREQUENTING THE STUDY SITE. THE MAXIMUM MOLLUSK BIOMASS IN ANY BENTHIC & CRYPTIC SAMPLE WAS 2.31 G DRY/M². IT WAS FELT THAT THE PREDATOR POPULATION WAS LIMITED BY THE SMALL STOCK OF POLYCHAETES & PERACARIDIAN CRUSTACEANS WHICH HAD A MAXIMUM BIOMASS IN ANY ONE SAMPLE EQUIVALENT TO 1.74 G DRY/M². THE MAJORITY OF THE FISHES CAPTURED WERE FORAGERS OVER A WIDE AREA. THE MAIN RESIDENTS WERE THE SYNGNATHIDS & THE GOLD-SPOUTED KILLIFISH, FLORIDICHTHYS CARPIO.

CARR, W. E. S. AND C. A. ADAMS
1972 NO. 27
EVIDENCE OF THE CLEANING HABIT IN OLIGOPLITES SAURUS AND DIPLODUS
HOLBOOKI
FISH BULL 76(4): 1111-1120.

QUANTITATIVE GRAVIMETRIC ANALYSES OF STOMACH CONTENTS OF JUVENILE LEATHERJACKET, OLCIOPOLITES SAURUS, & SPOTTED PINEFISH, DIPLODUS IN HOLBOOKI, HAVE REVEALED THAT BOTH SPECIES PASS THROUGH A CLEANING STAGE IN WHICH THEY CLEAN ECTOPARASITES FROM OTHER FISHES. THIS CLEANING BEHAVIOR IS MOST EVIDENT IN JUVENILES BETWEEN 26 & 40 MM STANDARD LENGTH. EVIDENCE OF LARGER CRANING IS SUPPORTED BY FIRST QUANTITATIVE DATA ON THE SIZE OF INDIVIDUALS PRESENT. THE FIRST QUANTITIES OF THE FAMILY SCARANGIDAE, NEITHER OF THE SPARIDAE NOR DIPLODUS NOR HOLBOOKI CLEANING AS A SOURCE OF FOOD. JUVENILES OF O. SAURUS FEED HEAVILY ON PLANKTON & SMALL SHRIMP WHEREAS JUVENILES OF D. HOLBOOKI FEED HEAVILY ON SEPIPHYTIC ALGAE, PLANKTON, & ENCRUSTING ORGANISMS. JUVENILES OF BOTH SPECIES EXHIBIT DISTINCT

CARL W. E. S. AND C. A. ADAMS
FOOD HABITS OF JUVENILE MARINE FISHES OCCUPYING SEAGRASS BEDS IN
THE ESTUARINE ZONE NEAR CRYSTAL RIVER, FLORIDA
TRANS. AN. FISH SOC. 102(3): 511-540.

QUANTITATIVE GRAVIMETRIC ANALYSES OF STOMACH CONTENTS WERE CARRIED OUT ON JUVENILES OF 21 SPECIES OF FISHES THAT COHABIT SEAGRASS BEDS NEAR CRYSTAL RIVER, FLORIDA. OUR EXPRESSED AS PERCENTAGE OF FOOD ITEMS & ARE EXPRESSED AS PERCENTAGE OF TOTAL STOMACH WEIGHTS OF THE SPECIES ANALYZED. H. PENSACOLAE, *H. PENSACOLAE*, *OPISTHONEMA OGILVIANUM*, *ANCHOTA HEPSITUS*, *HYPOTHAMPHUS UNIFASCIATUS*, *SYNODUS FOEOTENS*, *STRONGYLURA MARINA*, *OLIGOPLITES SAYURI*, *TRACHINOTUS FALCATUS*, *EUCINOSTOMUS GULA*, *CHRYSSOPTERA*, *BAIRDIELLA CHRYSSOPTERA*, *DIPLODUS HOLBROOKI*, *LAGODON RHOMBoides*, *CYANOSCIUS NEBULOSUS*, *CHARACODUS SABURRAEAE*, *MENIDIA BERYLLINA*, *NEPHELUS NEPHELUS*, ANALYSES OF STOMACH CONTENTS TAKEN FROM SMALL, SEQUENTIALLY ARRANGED SIZE CLASSES, ENABLED US TO DELINEATE QUITE DISTINCTIVE CHANGES IN FOOD HABIT IN MANY OF THE SPECIES. IN THE 15 SPECIES IN WHICH PLANKTIVOROUS FEEDING STAGES WERE DETECTED, ONLY ZOOPLANKTERS WERE CONSUMED IN MEASURABLE AMOUNTS. JUVENILES OF *H. PENSACOLAE* WERE ALMOST EXCLUSIVELY PLANKTIVOROUS THROUGHOUT MOST OF THE AVAILABLE SIZE RANGES & EXHIBITED A DISTINCT SELECTION FOR MOLLUSCAN VELIGER LARVAE.

COPEPODS, MYSIDS, & LARVAL CRUSTACEANS WERE THE PRINCIPAL PLANKTERS CONSUMED BY JUVENILES OF OTHER SPECIES. ONLY THREE SPECIES, *D. HOLBROOKI* & *L. RHOMBoides*, & *H. UNIFASCIATUS*, EXHIBITED HERBIVOROUS FEEDING STAGES. IN BOTH *D. HOLBROOKI* & *L. RHOMBoides*, THE HERBIVOROUS HABIT BEGAN QUITE EARLY IN JUVENILE DEVELOPMENT & FOLLOWED A PRELIMINARY PLANKTIVOROUS STAGE. WHEREAS ADULTS OF *D. HOLBROOKI* (& *H. UNIFASCIATUS*) WERE HERBIVOROUS, JUVENILES OF EIGHT SPECIES EXHIBITED CARNIVOROUS FEEDING STAGES, CONSUMING PRIMARILY BENTHIC INVERTEBRATES. OF THESE SPECIES, *G. SAURUS*, *H. PLUMieri*, *O. ICHRYSSOPTERA*, & *B. CHRYSSOPTERA* CONSUMED PRIMARILY POLYCHAETES; *C. SABURRAE* CONSUMED PRIMARILY AMPHIPODS; & *T. FALCATUS* CONSUMED MAINLY CRABS AFTER UTILIZING MYSIDS, SMALL SHRIMP & FISH IN EARLY STAGES. *

CHAO, L.N. AND J.A. MUSICK
1977. NO. 18
JUVENILE HISTORY, FEEDING HABITS
OF JUVENILE SCIAENID FISHES
FISH BULL. 75(4): 657-702.

HABITS, FEEDING HABITS, AND FUNCTIONAL MORPHOLOGY OF
JUVENILE STURGEON ID. 657-702
LIFE HISTORY: FEEDING HABITS, AND FUNCTIONAL MORPHOLOGY OF
YORK RIVER ESTUARY, VIRGINIA.

DARNELL, R. M. NO. 75
1958. FOOD HABITS OF FISHES AND LARGER INVERTEBRATES OF LAKE
PONTCHARTRAIN, LA., AN ESTUARINE COMMUNITY
PUBL INST MAR SCI, UNIV TEXAS 5: 353-416

THE LAKE PONTCHARTRAIN PHYSICAL ENVIRONMENT WAS CHARACTERIZED BY MODERATE TEMPERATURE, LOW SALINITY AND HIGH TURBIDITY. FOOD HABITS OF 31 FISH AND 4 INVERTEBRATE SPECIES WERE EXAMINED. MOST SPECIES WERE FOUND TO BE OMNIVOROUS WITH ONTOGENETIC SHIFTS IN DIET RECOGNIZABLE. ORGANIC DETRITUS WAS AN IMPORTANT FOOD ITEM FOR MOST SPECIES. TOP PREDATORS WERE SUPPORTED BY BOTH PLANKTONIC AND BENTHIC FOOD CHAINS, BUT DISTINCT CONSUMER TROPHIC LEVELS WERE NOT APPARENT.*

DARNELL, R.M. NO. 76
1961 TROPHIC SPECTRUM OF AN ESTUARINE COMMUNITY, BASED ON STUDIES OF
LAKE PONTCHARTRAIN, LOUISIANA
ECOLOGY 42(3): 553-568.

THE LAKE PONTCHARTRAIN COMMUNITY IS A BROADLY OPEN SYSTEM EXCHANGING NUTRIENTS WITH ADJACENT FRESH WATER AND SALT WATER AREAS AS WELL AS WITH NEIGHBORING MARSHES AND SWAMPS. CONSUMERS WITHIN THE LAKE APPARENTLY DEPEND IN GREAT MEASURE UPON PRIMARY PRODUCTION WHICH TAKES PLACE OUTSIDE THE LAKE, SO THE ESTUARINE COMMUNITY MAY BE TROPHICALLY UNBALANCED. THE MOST CONSPICUOUS SINGLE FOOD ITEM IN THE DIETS OF THE CONSUMERS OF THIS COMMUNITY IS ORGANIC DETRITUS WITH ITS ATTENDANT BACTERIA. INDIVIDUAL SPECIES DO NOT APPEAR TO CONFORM TO SPECIFIC TROPHIC LEVELS ON THE BASIS OF THE FOLLOWING CONSIDERATIONS: A) OMNIVORY ON THE PART OF MOST, IF NOT ALL, OF THE MAJOR CONSUMER SPECIES, B) NUTRITIONAL OPPORTUNISM AMONG THE CONSUMERS, C) ONTOGENETIC CHANGE IN THE FOOD HABITS OF THE CONSUMERS, D) IMPORTANCE OF ORGANIC DETRITUS IN THE NUTRITION OF THE CONSUMER SPECIES, AND E) COMPLEX NATURE OF THE ORIGIN OF DETRITUS. *

DESELLE, W.J. ET AL.²⁶
1978. NO.
A DISCRIMINANT FUNCTIONS ANALYSIS OF SUNFISH (*LEPOMIS*) FOOD HABITS
AND FEEDING NICHE SEGREGATION IN LAKE PONTCHARTRAIN, LA. ESTUARY
TRANS AM FISH SOC 107(5): 713-719.

THE FOOD HABITS OF FOUR SPECIES OF SUNFISH, *LEPOMIS MACROCHIRUS*, L.,
MICROLOPHUS, L., *PUNCTATUS*, & *L. GULOSUS* WERE STUDIED IN THE LAKE
PONTCHARTRAIN ESTUARY. FORTY ESTUARINE FOOD ITEMS WERE IDENTIFIED
FROM STOMACH SAMPLES. ALTHOUGH THE FOOD ITEMS WERE DIFFERENT FROM
THOSE OF *LEPOMIS* SPP. IN FRESH WATER, SPECIFIC FEEDING PATTERNS IN
REGARD TO PREY SIZE & SPACE PARTITIONING WERE COMPARABLE. A
DISCRIMINANT FUNCTIONS ANALYSIS WAS USED TO OBJECTIVELY COMPARE
SPECIFIC DIFFERENCES IN STOMACH CONTENT DATA. DIFFERENCES IN
DISCRIMINANT FUNCTION SCORES APPEARED TO BE DUE TO INTERSPECIFIC
FEEDING NICHE SEGREGATION.

DE SYLVA, D.P.

NO. 41 IN ESTUARIES RESEARCH VOL 1, ACADEMIC PRESS: 420-447
1975; FOOD WEBS IN ESTUARINE CRONIN, L.E. (ED) ESTUARINE

NEKTONIC FOOD WEBS WHICH COMPRISE BOTH ARE BENTHIC BUT MAY FEED
ESTUARINE NEKTON IS PREDOMINATELY FISHES WHICH ARE BENTHIC BUT MAY FEED BOTH
SURFACE-SWIMMING SPECIES & SPECIES WHICH ARE BENTHIC BUT MAY FEED THE
ESTUARINE NEKTON. BIOTIC & ABIOTIC FACTORS AFFECT THE
DISTRIBUTION OF ESTUARINE NEKTON & ITS FOOD; FEW STUDIES OF
DISTINCTIVE FOOD WEBS HAVE INCLUDED CONCOMITANT ENVIRONMENTAL STUDIES
NEKTONIC FOOD WEBS ARE COMPARED FROM ENGLAND, GUYANA, ARGENTINA, & SOUTH VIET
NAM. STUDIES OF NEKTONIC FOOD WEBS IN ESTUARIES SHOULD INCLUDE
THE NEW YORK BIGHT, SOUTH FLORIDA, GUYANA, ARGENTINA, & SOUTH VIET
NAMELY, STUDIES OF BIOTIC & ABIOTIC FACTORS, THOUGH DIEL & SEASONAL
ANALYSES OF BIOTIC & ABIOTIC FACTORS, APPROPRIATE SAMPLING,
SAMPLING, IMAGINATIVE USE & DEVELOPMENT OF APPROPRIATE SAMPLING & LABORATORY & FIELD STUDIES
GEARS, GOOD PRESERVATION OF SAMPLES, & LABORATORY & FIELD STUDIES OF ESTUARINE NEKTON.
WHICH INCLUDE

DEVANE, J. C., JR. NO. 54
1978. KING MACKEREL, SCOMBEROMORUS CAVALLA, IN ONSLOW BAY, NORTH
CAROLINA FISH SOC 107(4): 583-586.
TRANS AM FISH SOC 107(4): 583-586.

SCOMBEROMORUS CAVALLA (CUVIER),
THE STOMACHS OF 205 KING MACKEREL, SCOMBEROMORUS CAVALLA, WERE EXAMINED FOR FOOD
COLLECTED IN ONSLOW BAY, NORTH CAROLINA. THE 113 STOMACHS CONTAINING FOOD
ITEMS. THE STOMACH CONTENTS OF THE DOMINANT FISHES WERE ATLANTIC THREAD
HERRING, COMPOSED MAINLY OF FISHES (35% OCCURRENCE) & ATLANTIC THREAD HERRING,
WERE COMPOSED MAINLY OF TYRANNUS (28% OCCURRENCE). OTHER FISHES &
MENHADEN, BREVOORTIA OGILINUM (28% OCCURRENCE) IN ONSLOW BAY. LESS THAN 1% IN
MENHADEN, OPISTHONEMA OGILINUM FROM 14% TO 1% IN HERRING. INVERTEBRATES RANKED FROM 14%
TO 1% IN ONSLOW BAY. MENHADEN & ATLANTIC THREAD HERRING WERE PRIMARILY DOMINANT
ATLANTIC MENHADEN & KING MACKEREL COLLECTED DURING THE SPRING &
SUMMER MONTHS. THOSE COLLECTED DURING THE FALL & WINTER HAD A WIDER VARIETY OF FORAGE WITH ATLANTIC MENHADEN &
ATLANTIC THREAD HERRING BEING OF MINOR IMPORTANCE.

DIENER, R.A., A. INGLIS AND G.B. ADAMS
1974 NO. 36
STOMACH CONTENTS OF FISHES FROM CLEAR LAKE AND TRIBUTARY WATERS,
A TEXAS ESTUARINE AREA
CONT MAR SCI 18: 7-17

STOMACH CONTENTS WERE ANALYZED FROM 5,019 BONY FISHES, REPRE-
SENTING 40 SPECIES, CAUGHT DURING 1958 BY TRAWL IN THE CLEAR LAKE
AREA, A SECONDARY BAY SYSTEM LOCATED ON THE WEST SIDE OF UPPER
GALVESTON BAY, TEXAS. THE MOST FREQUENTLY OBSERVED ITEMS INCLUDED
POLYCHAETE ANNELIDS, COPEPODS, MYSIDACEANS, PENAEID SHRIMP, RIVER
SHRIMP (MACROBRACHIUM SP.), GRASS SHRIMP (PALAEMONETES SP.), PLANT
DEBRIS, ORGANIC DETRITUS, MUD, & SAND.

DUNN, J. R.

1979 NO. 74
PREDATOR-PREY INTERACTIONS IN THE EASTERN BERING SEA
STROUD & C. PEPPER (EDS) SYMP PRED-PREY SYSTEM FISH MGMT, ATL, GA: 81-92

FOOD HABITS OF POLLACK, YELLOWFIN SOLE, GREENLAND TURBOT AND PACIFIC COD WERE EXAMINED. DIETARY DIFFERENCES WERE RELATED TO MORPHOLOGY AND OTOGENETIC PATTERNS. MOST SPECIES OF DEMERSAL FISHES PRESENT WERE OPPORTUNISTIC FEEDERS WITH HIGHLY VARIABLE DIETS IN SPACE AND TIME. FEW SPECIES WERE COMPLETELY DEPENDENT ON BENTHIC PREY.*

FOX, L. S. AND C. J. WHITE
1969 NO. 71
FEEDING HABITS OF THE SOUTHERN FLounder, *PARALICHTHYS LETHOSTIGMA*,
IN BARATARIA BAY, LOUISIANA
LOUISIANA ACAD SCI 32: 31-38.

VOLUMES & FREQUENCY OF OCCURRENCE OF THE STOMACH CONTENTS OF 305 SPECIMENS WERE ANALYZED. NO SIGNIFICANT DIFFERENCES IN FOOD HABITS WITH RELATION TO SEX OR SIZE WERE DETECTED. THIS SPECIES IS HIGHLY PREDACIOUS, WITH MAJOR FOOD SOURCES BEING FISH, SHRIMP, & CRABS. THE FEEDING HABITS VARY WITH SEASONAL AVAILABILITY IN BARATARIA BAY. SEINE SAMPLES WERE USED TO DETERMINE AVAILABILITY & SEASONAL ABUNDANCE OF 46 SPECIES PREYED UPON.

FRITZ, E.S. NO. 55
1974. TOTAL DIET COMPARISON IN FISHES BY SPEARMAN RANK CORRELATION

COEFFICIENTS (1): 210-214.

THE SPEARMAN RANK CORRELATION & T-TEST WERE EMPLOYED AS A NOVEL METHOD FOR COMPARATIVE ANALYSIS OF TOTAL DIETS OF THREE SPECIES OF KILLIFISH (CYPRINODONTIDAE). THE CALIFORNIA KILLIFISH, *FUNDULUS PARVIPINNIS* & HUMMICHOOGF. HETEROCЛИTUS, OF NOVA SCOTIA HAVE SIMILAR DIETS IN SIMILAR HABITATS, BUT REMOTELY SEPARATED HABITATS IN CONTRAST TWO POPULATIONS OF F. HETEROCЛИTUS INHABIT TWO PHYLOGENETICALLY RELATED SYMPATRIC SPECIES, F. HETEROCЛИTUS & THE BANDED KILLIFISH, F. DIAPHANUS ARE SHOWN TO HAVE DIFFERENCES OF THESE RESULTS AGREE WITH THE EXPECTED FEEDING PERFORMANCE OF CLOSELY RELATED SPECIES INHABITING THE SAME TROPHIC LEVEL SYMPATRICALLY & ALLOPATRICALLY.

HAERTEL, L. AND C. OSTERBERG
1967 NO. 57
ECOLOGY OF ZOOPLANKTON, BENTHOS AND FISHES IN THE COLUMBIA RIVER
ESTUARY. ECOLOGY 48(3): 459-472.

FAUNA OF THE COLUMBIA RIVER ESTUARY WERE SAMPLED REGULARLY FOR 21 MONTHS. ANALYSES OF PLANKTON SAMPLES INDICATED THAT THREE DISTINCT POPULATIONS EXISTED IN THE ESTUARY: A FRESHWATER GROUP, A MARINE GROUP, & AN INDIGENOUS ESTUARINE GROUP. THE LATTER GROUP, CONSISTED PRINCIPALLY OF A LARGE POPULATION OF EURYTEMORA HIRUNDINOIDES. CHANGES IN THE SALINITY OF THE ESTUARY WERE REFLECTED IN THE COMPOSITION OF THE PLANKTON. THE MAJORITY OF THE FISH & BENTHIC INVERTEBRATES FOUND IN THE ESTUARY ARE EURYHALINE. THE LARGEST NUMBERS OF FISH SPECIES, AS WELL AS THE LARGEST NUMBERS OF INDIVIDUALS, OCCUPY THE SLIGHTLY BRACKISH WATERS OF THE CENTRAL PORTION OF THE ESTUARY. THE MAJOR PLANKTON BLOOMS ALSO OCCUR IN THIS AREA. STARRY FLOUNDER (*PLATICHTHYS STELLATUS*) & SAND SHRIMP (*CRANGON FRANCISORUM*) USE THE UPPER ESTUARY AS A NURSERY GROUND. EXTENSIVE ANALYSES OF FISH STOMACH CONTENTS CONFIRM THE AVAILABILITY OF PREY HABITS OF FISHES GENERALLY REFLECT THE AVAILABILITY OF PREY.

HANSEN, D. J.

NO. 1
1969. GROWTH, MIGRATION,
FOOD, AND MICROPONERUS UNDULATUS NEAR PENSACOLA, FLORIDA.
FISH BULL 68(1): 135-146

THE ABUNDANCE, GROWTH, AGE COMPOSITION, FOOD, MIGRATION, & REPRODUCTION OF THE TWO SPECIES WERE STUDIED AT TWO LOCATIONS FOR EACH SPECIES FROM AUGUST 1963 TO DECEMBER 1965. THE MATERIALS COMPRISED 22 FISHING COLLECTIONS AT EACH STATION, TAKEN IN ABOUT 500 HOURS OF TRAWLING. THE STOMACH CONTENTS OF 3,577 PINFISH & 2,520 ATLANTIC CROAKERS INDICATED THAT PINFISH ARE OMNIVOROUS & CROAKERS CARNIVOROUS. PRINCIPAL FOODS WERE VEGETATION, CRUSTACEANS & POLYCHAETE FOR PINFISH & ANNELIDS. FISH & GARTHROPODS FOR CROAKERS. TYPES OF FOOD IN PINFISH STOMACHS WERE SIMILAR AT ALL SIZES & SEASONS, BUT THE RELATIVE AMOUNT OF EACH TYPE DIFFERED BY SEASON & SIZE OF FISH. FOODS IN CROAKER STOMACHS DIFFERED AT THE TWO STATIONS, BUT WERE SIMILAR FROM YEAR TO YEAR. THE AVERAGE FOOD VOLUME IN THE STOMACHS VARIED WITH TIME OF YEAR, LOCATION, & FISH SIZE. VOLUMES OF FOOD IN STOMACHS OF BOTH SPECIES DECREASED WHEN THE FISH MOVED FROM THE ESTUARY. LENGTH-FREQUENCY DISTRIBUTIONS CAN BE USED TO ESTIMATE AGE IN BOTH SPECIES. PINFISH, & POSSIBLY CROAKERS, FROM ANNULI ON THEIR SCALES. GROWTH OF PINFISH & ATLANTIC CROAKER VARIED FROM YEAR TO YEAR. SOME FISH OF BOTH SPECIES HAD DEVELOPING GONADS IN THE FALL OF THEIR FIRST YEAR OF LIFE & MAY SPAWN. BOTH SPECIES MIGRATE OFFSHORE IN THE FALL TO SPAWN. THE FRY & SOME ADULTS RETURN TO THE ESTUARY IN THE WINTER & SPRING. ABUNDANCE OF PINFISH & ATLANTIC CROAKERS WAS HIGHEST IN LATE SPRING & EARLY SUMMER. PINFISH AT BOTH STATIONS AT ONE STATION WERE LESS ABUNDANT IN 1964 THAN IN 1963 OR 1965. YEARLY DIFFERENCES IN ABUNDANCE OF CROAKERS WERE NOT LARGE AT THE OTHER LOCATION.

HASTINGS, R. W.
1973. NO. 56
BIOLOGY OF THE PYGMY SEA BASS, SERRANICULUS PUMILIO (PISCES:
SERRANIDAE)
FISH BULL 71(1): 235-241.

DURING THE PERIOD FROM 1968 TO 1971, NUMEROUS SPECIMENS OF THE SERRANICULUS PUMILIO, WERE COLLECTED IN SHALLOW WATERS OF THE NORTHERN GULF OF MEXICO. THIS PAPER PRESENTS BIOLOGICAL DATA ACCUMULATED FROM THESE & OTHER SPECIMENS IN THE FISH COLLECTIONS OF FLORIDA STATE UNIVERSITY & FROM SCATTERED LITERATURE REFERENCED FROM NORTH CAROLINA ALONG THE CONTINENTAL MARGIN OF THE WESTERN ATLANTIC OCEAN TO GUYANA, BUT IT APPARENTLY DOES NOT OCCUR IN THE WEST INDIES. IT HAS BEEN COLLECTED AT DEPTHS FROM 11 TO 117 M, USUALLY OVER SAND OR SHELL BOTTOMS NEAR CORAL OR ROCK REEFS OR ACCUMULATIONS OF MOLLUSK SHELLS. INDIVIDUALS MOVE ABOUT CONSIDERABLY, ALTHOUGH THEY SPEND MUCH TIME RESTING ON THE BOTTOM. S. PUMILIO IS A SYNCHRONOUS SPERMAPHRODITE, BUT PAIRS MATE TO EXCHANGE GAMETES & A SELF-FERTILIZATION PROBABLY NEVER OCCURS. SPAWNING OCCURS BETWEEN MARCH & AUGUST OR SEPTEMBER IN THE NORTHERN GULF OF MEXICO. A LENGTH-FREQUENCY DISTRIBUTION OF SPECIMENS COLLECTED IN THE NORTHERN GULF IS PRESENTED TO SHOW THE GROWTH RATE OF FIRST YEAR FISH. JUVENILES (15-20 MM SL) WHICH APPEAR INSHORE IN SEPTEMBER REACH A SIZE OF 50-55 MM BY THE FOLLOWING JUNE. MOST FISH MOVE OFFSHORE TO DEEPER WATER FOR THE WINTER (JANUARY & FEBRUARY) & INDIVIDUALS LARGER THAN 55 MM APPARENTLY NEVER APPEAR INSHORE. SMALL CRUSTACEANS ARE THE MOST IMPORTANT FOOD ITEMS.

HEARD, R.W.

NO. 53
1975 FEEDING HABITS OF WHITE CATFISH FROM A GEORGIA ESTUARY

FLORIDA SCIENTIST 38(1): 20-28.

THE FOOD HABITS OF THE WHITE CATFISH, *ICHTALURUS CATUS* (L.), FROM NORTH NEWPORT RIVER, AN ESTUARINE AREA OF THE GEORGIA COAST, WERE STUDIED. THE DIGESTIVE TRACTS OF 174 SPECIMENS EXAMINED CONTAINED OVER 5000 RECOGNIZABLE FOOD-ITEMS REPRESENTING SOME 50 DIFFERENT SPECIES OF ORGANISMS. CRUSTACEANS, ESPECIALLY AMPHIPODS, ENTHRALLED THE MOST FREQUENTLY OCCURRING & MOST NUMEROUS ORGANISMS ENCONTERED. THE VARIETY OF ORGANISMS RECOVERED FROM THE DIGESTIVE TRACTS OF WHITE CATFISH IN THIS STUDY & FROM THE STOMACHS OF WHITE CATFISH PREVIOUSLY STUDIED BY OTHERS, INDICATE THAT THIS FISH IS AN OPPORTUNISTIC, OMNIVOROUS FEEDER. SEASONAL MOVEMENTS & FEEDING PATTERNS FOR *I. CATUS* ARE BRIEFLY DISCUSSED.

HENWOOD, T., P. JOHNSON AND R. HEARD
1978 NO. 68
FEEDING HABITS AND FOOD OF THE LONGSPINED PORGY, STENOTOMUS
CAPRINUS BEAN
NE GULF SCI 2(2): 133-137.

THE LONGSPINED PORGY, STENOTOMUS CAPRINUS BEAN, IS AN ABUNDANT
SPECIES IN THE 40 TO 100 METER DEPTH RANGE OVER MUCH OF THE
NORTHERN & WESTERN GULF OF MEXICO; GUNTER & KNAPP (1951),
SIEBENALER (1952), HILDEBRAND (1954), CALDWELL (1955), ROITHMAYER
(1965), MOORE ET AL (1970), PERRY (1970), FRANKS ET AL (1972)
& CHITTENDEN & MCEACHERN (1976) HAVE DOCUMENTED THE OCCURRENCE
OF THIS SPECIES IN THE 20 TO 120 METER RANGE. DESPITE AMple
EVIDENCE THAT THE PORGY IS A MAJOR MEMBER OF THE OFFSHORE DEMERSAL
FISHING POPULATION, THERE HAVE BEEN NO PUBLISHED REPORTS ON THE
FEEDING BEHAVIOR, OR FOOD OF THIS FISH. THIS STUDY WAS UNDERTAKEN
IN THE HOPES OF CHARACTERIZING MAJOR FOOD ITEMS & FEEDING PATTERNS
WITHIN THE SPECIES.*

HOESE, H.D. AND DR. HOESE
1967; NO. 52
STUDIES ON THE BIOLOGY OF THE FEEDING REACTION IN GOBIOSOMA BOSCI

IN THE NAKED GOBY, GOBIOSOMA BOSCI, AN INHABITANT OF OYSTER REEFS, A FEEDING REACTION WAS INDUCED WITH DIALYZED OYSTER EXTRACTS: CERTAIN AMINO ACIDS & AMINES WITH SIMILAR MOLECULAR STRUCTURE, ALSO INDUCED FEEDING. BASICALLY THEY HAVE STRAIGHT CHAINS, 2-5 CARBON ATOMS, & NO GROUP INTERFERING WITH THE AREA OF THE NITROGEN ATOM. DIALYZED & CHROMATOGRAPHED OYSTER EXTRACTS WERE BITTEN BY GOBIES IN AREAS CORRESPONDING WITH KNOWNS OF ALANINE, ASPARTIC ACID, GLUTAMIC ACID, & AN UNKNOWN, WHICH WAS UNKNOWN & AN UNKNOWN NEXT. WAS HEAT STABLE, RECEIVED MOST OF THE RESPONSE WITH ALANINE & TO WAS HEAT STABLE, RECEIVED MOST OF THE RESPONSE WITH ALANINE & TO GOBIES RESPONDED TO WATER IN WHICH OYSTERS HAD BEEN HELD & TO WATER FROM AN OYSTER REEF, BUT NOT TO SEA WATER. FEEDING BY GOBIOSOMA BOSCI IS DIVIDED INTO TWO PHASES. THE FIRST SEEMS TO BE FOLLOWING A VOLATILE COMPOUND, POSSIBLY AN AMINE, IN THE OYSTER FEEDING ITSELF IS INDUCED BY A HEAT-STABLE UNKNOWN, WITH LESSER CONTRIBUTION BY CERTAIN AMINO ACIDS.

HOLLAND, A.F. ET AL. 61
1980 INFLUENCE OF PREDATION ON INFANAL ABUNDANCE IN UPPER CHESAPEAKE
BAY, USA MAR BIOL 57: 221-235

THE IMPORTANCE OF PREDATORS IN CONTROLLING THE DENSITIES OF INFANAL (>0.5 MM) ORGANISMS WAS INVESTIGATED IN THE MESOHALINE REGION OF THE UPPER CHESAPEAKE BAY (USA) USING FIELD EXPERIMENTS. THE ROLE OF PREDATORS IN CONTROLLING INFANAL DENSITY & COMMUNITY CHARACTERISTICS VARIED WITH HABITAT TYPE, SEASON (I.E., PREDATOR ABUNDANCE) & DEVELOPMENTAL OR SUCCESSIONAL STAGE OF THE COMMUNITY. FEW INFANAL SPECIES WERE ADVERSELY AFFECTED BY PREDATOR EXCLUSION. SPECIES THAT INCREASED GREATLY IN ABUNDANCE IN THE ABSENCE OF PREDATORS (E.G. HETEROPODA, ASTREBLOPSIOBENEDICTINEREA, SUCCINEA, & JUVENILE MACOMA BALTHICA & MYA ARENARIA) LIVED NEAR THE SEDIMENT-WATER INTERFACE & HAD MAJOR POPULATION PULSES FROM FALL THROUGH SPRING. SPECIES WHOSE ABUNDANCE INCREASED MODERATELY OR WERE NOT AFFECTED BY PREDATOR EXCLUSION WERE DEEPER BURROWING ORGANISMS (E.G. HETEROMASTUS FILIFORMIS & ADULT MYA ARENARIA), OR WERE RELATIVELY SMALL ORGANISMS (E.G. PARAPRIONOSPiro PINNATA, SCOLECOPIDES VIRIDIS & PELOSCOLEX GABRIELAE) WHOSE PRINCIPAL PREDATORS COULD BE OTHER MEMBERS OF THE INFANFAUNA. COMPETITION DID NOT APPEAR TO BE AN IMPORTANT FACTOR CONTROLLING INFANAL DENSITY IN THESE EXPERIMENTS.

HYSLOP, E.J.
1980. NO. 7
STOMACH CONTENTS ANALYSIS-A REVIEW OF METHODS AND THEIR
APPLICATION
J FISH BIOL 17: 411-429.

METHODS FOR ANALYSING FISH STOMACH CONTENTS ARE LISTED & CRITICALLY ASSESSED WITH A VIEW TO THEIR SUITABILITY FOR DETERMINING DIETARY IMPORTANCE-THIS TERM IS DEFINED. DIFFICULTIES IN THE APPLICATION OF THESE METHODS ARE DISCUSSED & WHERE APPROPRIATE, ALTERNATIVE APPROACHES PROPOSED. MODIFICATIONS WHICH HAVE PRACTICAL VALUE ARE ALSO CONSIDERED. THE NECESSITY OF LINKING MEASUREMENTS OF STOMACH CAPACITY IS EMPHASIZED & THE EFFECTS OF DIFFERENTIAL DIGESTION UPON INTERPRETATION OF STOMACH CONTENTS OUTLINED. THE BEST MEASURE OF DIETARY IMPORTANCE IS PROPOSED AS ONE WHERE BOTH THE AMOUNT & BULK OF A FOOD CATEGORY ARE RECORDED.

JUNE, F.C. AND F.T. CARLSON
1971. NO. 51 YOUNG ATLANTIC MENHADEN, BREVOORTIA TYRANNUS, IN RELATION
TO METAMORPHOSIS 68(3): 493-512.
FISH BULL 68(3): 493-512.

TO REAR THIS SPECIES IN CAPTIVITY REQUIRED KNOWLEDGE OF THE KINDS
OF ORGANISMS IT ATE LARVAE TO PLANKTON (COPEPODS), BUT THERE WERE
SIMILARITIES AS WELL AS DIFFERENCES BETWEEN THE ALIMENTARY TRACT
CONTENTS OF THE FISH & THE COMPOSITION OF THE PLANKTON COMMUNITY.
CHANGES IN FOOD HABITS DURING METAMORPHOSIS WERE ACCCOMPANIED BY
GROSS MORPHOLOGICAL CHANGES IN THE ALIMENTARY TRACT & RELATED
STRUCTURES. LABORATORY STUDIES OF LARVAE DISCLOSED THAT THEIR
FAILURE TO FEED AT LOW LIGHT INTENSITIES, & PRESUMABLY PROBABLY
THEIR DEFECATORY RESPONSE TO CAPTURE & PRESERVATION PROBABLY
CONTRIBUTED TO THE HIGH INCIDENCE OF EMPTY ALIMENTARY TRACTS IN
FIELD COLLECTIONS.

KINCH, J. C. NO. 50
1979 TROPHIC HABITS OF THE
TROPHIC ISLAND, FLORIDA
CONT MAR SCI 22: 77-90

THE PRESENT INVESTIGATION WAS DIRECTED TOWARD DESCRIBING THE TROPHIC HABITS & FACTORS WHICH AFFECT THE DISTRIBUTION OF JUVENILE FISHES IN A DREDGED RESIDENTIAL CANAL OF A SOUTHWEST FLORIDA OCEAN-FRONT DEVELOPMENT. THE DATA PRESENTED PROVIDE A QUANTITATIVE EXAMINATION OF BOTH THE SPATIAL & TEMPORAL ASPECTS OF THE MORE ABUNDANT SPECIES. A STRONG SIMILARITY WAS FOUND BETWEEN THE TROPHIC HABITS OF FISHES WITHIN THE CANALS & PUBLISHED DATA FOR FISHES OF IDENTICAL AGE CLASSES FROM NATURAL AREAS.

KJELSON, M.A. ET AL NO 49
1975. GENERAL FEEDING ECOLOGY OF POSTLARVAL FISHES IN THE NEWPORT
RIVER ESTUARY
FISH BULL 73(1): 137-144.

FOOD PREFERENCES, FEEDING INTENSITY & CHRONOLOGY, EVACUATION RATES, & DAILY RATINGS WERE DETERMINED FOR POSTLARVAL STAGES OF ATLANTIC MENHADEN, BREVOORTIA TYRANNUS (25-32 MM); PINFISH, LAGODON RHOMBOIDES (16-20 MM); & SPOT, LEIOSTOMUS XANTHURUS, (17-24 MM). FOUR COPEPOD TAXA, CENTROPAGES, LEPTOMORpha ACARTIA, & HARPACTICOIDA, MADE UP 76-99% OF THE TOTAL GUT CONTENTS POST-LARVAL FEEDING INTENSITY WAS GREATESSED DURING EARLY DAYLIGHT HOURS. POSTLARVAL MENHADEN LOST AN ESTIMATED 60% OF THEIR ORIGINAL GUT CONTENTS DUE TO THE STRESS OF HANDLING & CAPTURE. SIMILAR STRESS CAUSED NO FOOD LOSS IN EITHER POSTLARVAL PINFISH OR SPOT. GASTROINTESTINAL EVACUATION OF COPEPODS & ARTEMIA NAUPLII WERE DESCRIBED BY LINEAR REGRESSION. EVACUATION RATES VARIED DIRECTLY WITH THE AMOUNT OF FOOD IN THE GUT. RATE CONSTANTS WERE USED IN CONJUNCTION WITH INFORMATION ON THE CHRONOLOGY OF GUT CONTENTS TO DETERMINE DAILY RATINGS. DAILY RATION ESTIMATES AS A PERCENT OF THE FISH'S WET BODY WEIGHT WERE: MENHADEN, 4.9%; PINFISH, 3.5%; SPOT, 4.3% & 9.0%. THE RATION ESTIMATES FOR SPOT IN TERMS OF CALORIES PER FISH PER DAY WERE SIMILAR TO THE METABOLIC NEEDS ESTIMATED FROM OXYGEN CONSUMPTION MEASUREMENTS BUT WERE LOWER THAN THE ESTIMATES FROM OXYGEN CONSUMPTION FOR MENHADEN & PINFISH.

KOBYLINSKI, G.J. AND P.F. SHERIDAN

1979 NO. 48
DISTR. ABUND. FEEDING AND LONG-TERM FLUCT. OF LEIOSTOMUS
XANTHURUS AND MICROPOGONIAS UNDULATUS IN APALACHICOLA BAY, FL. 72-77
CONT MAR SCI 22: 149-161

SEASONAL DISTRIBUTION, ABUNDANCE & TROPHIC FUNCTIONS OF LEIOSTOMUS XANTHURUS & MICROPOGONIAS UNDULATUS WERE STUDIED AT A SERIES OF SPOTS FOUND IN APALACHICOLA BAY, FLORIDA. HIGHEST CATCH/EFFORT OF SPOT WAS YIELDED IN UPPER EAST BAY & EAST BAY. APALACHICOLA BAY & EAST BAY YIELDED THE GREATEST CATCH/EFFORT OF CROAKER. ABUNDANCE OF THE TWO SPECIES PEAKED IN THE SPRING & DECLINED IN THE FALL. STOMACH CONTENTS SHOWED CROAKER & SPOT ARE PRIMARILY OMNIVOROUS. PRINCIPAL FOODS OF SPOT INCLUDED POLYCHAETES, HARPACTICOID COPEPODS, DETRITUS & BIVALVES. CROAKER CONSUMED PRIMARILY POLYCHAETES & DETRITUS. COMPARISON OF DIETS OF CROAKER & SPOT REVEALED HIGH INTRASPECIFIC SIMILARITY ON A SIZE CLASS BASIS & HIGH INTERSPECIFIC SIMILARITY ON AN AREAL BASIS. POPULATION FLUCTUATIONS & SPATIAL DISTRIBUTION OF CROAKER & SPOT WERE STUDIED AS A RESPONSE TO A NUMBER OF ENVIRONMENTAL & TROPHIC FACTORS. PRESENCE OR ABSENCE OF BENTHIC MACROPHYTES, SALINITY, COLOR & TURBIDITY, BOTTOM TYPE & FOOD AVAILABILITY DETERMINED THE LONG-TERM SPATIAL DISTRIBUTION OF THE TWO FISHES. TEMPERATURE IS A CRITICAL PARAMETER FOR AT LEAST ONE OF THESE SPECIES WHILE VARIATIONS IN RAINFALL & RIVER FLOW HAVE LITTLE EFFECT ON EITHER POPULATION.

LANGTON, R. W. AND R. E. BOWMAN

NO. 37

1980. FOOD OF FIFTEEN NORTHWEST ATLANTIC GADIFORM FISHES

NOAA TECHNICAL REPORT NMFS SSSRF-740, 23PP

THE FOOD OF 15 SPECIES OF GADIFORM FISHES OCCURRING IN THE NORTHWEST ATLANTIC, FROM CAPE HATTERAS, N.C., TO NOVA SCOTIA, HAVE BEEN INVESTIGATED FOR THE YEARS 1969-72. THE POPULATIONS OF ATLANTIC COD, *GADUS MORHUA*; POLLACK, *POLLACHIUS VIRENS*; SILVER HAKE, *MERLUCCIO BILINEARIS*; WHITE HAKE, *UROPHYCIS TENUIS*; OFFSHORE HAKE, *MERLUCCIO ALBIDUS*; CUSK, *PISCIDIUS CUSCUS*; BROSME BROSME; *CHEMISTUS*; *COELORHYNCHUS CARMINATUS*; *COELORHYNCHUS MACROZOARCTES*; *COLEOPHIDA*; *LEPODOPHIDUM CERVINUM*; & *SCIAENIDAE*. THE RED HAKE, *UROPHYCIS REGIUS*, ALSO HAVE SIMILAR DIETS, BEING PRIMARILY PIICYDROUS. SPOTTED HAKE, *UROPHYCIS*, & SPOTTED HAKE, *UROPHYCIS*, PREYING ON BOTH FISH & INVERTEBRATES, FEEDING ON BOTH FISH & INVERTEBRATES, & ARE MIXED SPECIES, FEEDING ON BOTH FISH & INVERTEBRATES. THE FINAL SEVEN SPECIES, FOURBEARD ROCKLING, *ENCHELYOPUS BRONDFIN*; HAKE, *UROPHYCIS CERVI*; NEZUMIA BAIRDII; LONGNOSE GRENADEIER, *LONGNOSE GRENADEIER*; MARLIN SPIKE, *NEZUMIA CUSCUS*; & COELOPHIDA; CUSK-EEL, *LEPODOPHIDUM CERVINUM*; & OCEAN POUT, *MACROZOARCTES AMERICANUS*; PREY ALMOST EXCLUSIVELY ON INVERTEBRATES.

LEVINGS, C. D. NO⁴⁷ FEEDING AND PARTICLE SELECTION BY WINTER
1974 SEASONAL CHANGES IN FLOUNDER (PSEUDOPLEURO
FLOUNDER (PSEUDOPLEURONECTES AMERICANUS)
TRANS AM FISH SOC 103(4): 828-832.

THE MEAN WEIGHT OF FOOD ITEMS FROM WINTER FLOUNDER (PSEUDOPLEURO
NECTES AMERICANUS) AT ST. MARGARET'S BAY, NOVA SCOTIA CLOSELY AVAL
COINCIDED WITH THE MEAN WEIGHT OF BENTHIC PREY POTENTIALLY AVAI
LABLE FLOUNDER LARGER THAN THE MEAN LENGTH (29 CM) ATE HEAVIER
PARTICLES. SMALL PARTICLES WERE CONSISTENTLY DISREGARDED. THERE
WERE SEASONAL CHANGES IN THE WEIGHTS OF FOOD ITEMS USED & IN THE
PROPORTION OF ORGANISMS TO DETRITUS IN STOMACHS.

MANOOCHE, C.S.

1971. NO²⁰ HABITS OF ADULT STRIPED BASS, MORONE SAXATILIS,
FROM ALBEMARLE SOUND, NORTH CAROLINA
CHESAPEAKE SCI 14(2): 73-86

A TOTAL OF 1,094 YEARLING & ADULT STRIPED BASS, MORONE SAXATILIS, WERE COLLECTED FROM ALBEMARLE SOUND, NORTH CAROLINA, FROM JULY 1970 THROUGH AUGUST 1971. SPECIMENS WERE CAPTURED BY GILL NETS, HOOK & LINE, TRAWL, POUND NETS, & PURSE SEINE, & RANGED IN SIZE FROM 125 TO 714 MM TOTAL LENGTH. APPROXIMATELY 77 PERCENT OF THE FISH CONTAINED FOOD CONSISTING OF 3.249 INDIVIDUAL ORGANISMS. TWENTY-FIVE SPECIFIC GROUPS OF FOOD ORGANISMS WERE IDENTIFIED. THESE INCLUDED FIFTEEN SPECIES OF FISH & TEN TAXA OF INVERTEBRATE. FISH WERE THE MAIN FOODS OF STRIPED BASS & OCCURRED IN 93 PERCENT OF THE STOMACHS. CONTAINING FOOD, PREDOMINANT SPECIES IDENTIFIED WERE ATLANTIC MENHADEN, BREVOORTIA TYPANNUS, BLUEBACK HERRING, ALDUSA AESTUARIA, ANCHOA MITCHILLI, & ANCHOA MITCHELLI. INVERTEBRATES WERE OF SECONDARY IMPORTANCE & CONSISTED MAINLY OF BLUE CRABS, CALLINECTES SAPIDUS, PENAEID SHRIMP, & GAMMARID AMPHIPODS. FOOD HABITS VARIED SUBSTANTIALLY WITH SIZE OF FISH. AREA & SEASON OF COLLECTION. CANNIBALISM WAS RARELY ENCOUNTERED. ONLY TWO YEARLING STRIPED BASS FROM OVER TWO HUNDRED EXAMINED (1 PERCENT) CONTAINED YOUNG MORONE SAXATILIS. NO STRIPED BASS WERE FOUND IN LARGER SPECIMENS. STRIPED BASS ARE CAPABLE OF CONSUMING CLupeids WHICH ARE APPROXIMATELY 60 PERCENT OF STRIPED BASS LENGTH. STRIPED BASS GENERALLY FEED ON SMALLER FISH WHICH AVERAGED 20 PERCENT OF THE PREDATOR'S LENGTH. SIZE AVAILABILITY OF FORAGE IS AN IMPORTANT FACTOR IN ALBEMARLE SOUND. STRIPED BASS PREFERRED THE SOFT-RAYED SPECIES WHICH GENERALLY OCCURRED AS JUVENILES IN THE SOUND.

MANDUCH, C.S.

1977. NO. 21
FOOD OF THE RED PORGY, *PAGRUS PAGRUS LINNAEUS* (SPARIDAE) FROM
NORTH CAROLINA AND SOUTH CAROLINA
BULL MAR SCI 24(4): 776-787

DIGESTIVE TRACTS OF 779 RED PORGY, *PAGRUS PAGRUS*, 46 TO 625 MM TOTAL LENGTH COLLECTED BY HOOK & LINE & TRAWL OFF NORTH CAROLINA & SOUTH CAROLINA FROM MAY 1972 THROUGH APRIL 1974 WERE EXAMINED. NINETY-SEVEN PERCENT OF THE SPECIMENS CONTAINED FOOD REPRESENTING 69 TAXA OF ORGANISMS. SEVENTY-FOUR PERCENT OF THE FOODS (360% OF THE VOLUME) OF ADULT *PAGRUS* WAS COMPOSED OF OBLIGATE BENTHIC ANIMALS & APPROXIMATELY 90% OF THE DIET WAS OF ORGANISMS WHICH LIVE NEAR THE BOTTOM. INVERTEBRATES OCCURRED PRIMARILY BY CRUSTACEANS, MOLLUSKS, & ECHINODERMS OCCURRED IN 89% OF THE ADULT FISH. CRABS, MAINLY MAJIDS, PORTUNIDS & CALAPPIIDS WERE THE PRE-DOMINANT FOOD BY BOTH FREQUENCY OF OCCURRENCE & VOLUME. FISH REPRESENTING 14 FAMILIES OCCURRED IN 24% OF THE STOMACHS & COMPRISED 15% OF THE FOOD VOLUME OF ADULT RED PORGY WHILE LARGER JUVENILES, 130 TO 162 MM TOTAL LENGTH, INGESTED SIMILAR FOODS AS ADULTS. SMALL JUVENILES, 46-64 MM, FEED ON AMPHIPODS, COPEPODS, STOMATOPODS, & ANNELIDS. SLIGHT DIFFERENCES IN FREQUENCY OF OCCURRENCE OF ORGANISMS IN THE DIET WERE NOTED BETWEEN GEOGRAPHICAL AREAS, DEPTHS, & SEASONS. SIZE OF RED PORGY PRODUCED A MORE PRONOUNCED EFFECT ON THE DIET.

MCEACHRAN, J. D., D. F. BOESCH AND J. A. MUSICK
1976. NO. 2²
FOOD DIVISION WITHIN TWO SYMPATRIC SPECIES-PAIRS OF SKATES
(PISSES: RAJIDAE)
MAR BID 35: 301-317

FOOD HABITS OF TWO SYMPATRIC SPECIES-PAIRS OF SKATES (*RAJA ERINACEA* - *R. OCELLATA* & *R. RADIANA* - *R. RADIATA*), WHICH OCCUR OFF THE EAST COAST OF NORTH AMERICA WERE INVESTIGATED. STOMACHS FROM OVER 1600 SPECIMENS OF THE 4 SPECIES WERE COLLECTED DURING WINTER, SUMMER, & AUTUMN OF 1969 & THE WINTER OF 1970. DIETS OF *R. ERINACEA* & *R. OCELLATA* CONSISTED LARGELY OF AMPHIPODS, DECAPOD CRUSTACEANS & POLYCHAETES. HOWEVER, *R. OCELLATA* CONSUMED RELATIVELY MORE FISHES & POLYCHAETES THAN *R. ERINACEA*. THESE TWO SKATES ATE MANY OF THE SAME SPECIES BUT IN DIFFERENT PROPORTIONS; *R. OCELLATA* TENDED TO FEED ON INFANNA & *R. ERINACEA* TENDED TO FEED ON EPIFAUNA. FOOD PREFERENCES OF THE TWO SPECIES MAY BE CORRELATED. THE DIFFERENCE IN SHAPE OF THE MOUTH & NUMBER OF TOOTH ROWS: *R. ERINACEA* & *R. RADIATA* BOTH FED HEAVILY ON DECAPOD CRUSTACEANS & EUPHAUSIDS. BUT POLYCHAETES WERE RELATIVELY MORE IMPORTANT TO *R. RADIANA* & MYSIDS WERE RELATIVELY MORE IMPORTANT TO *R. RADIATA*. *RADIATA* HAD A VERY DIVERSIFIED DIET & FEED ON BOTH EPIFAUNA & INFANNA. THE DIET OF *R. RADIATA* WAS VERY RESTRICTED & CONSISTED ALMOST ENTIRELY OF EPIFAUNA. DIETS OF THE TWO SPECIES WERE SIMILAR, BUT ISOPODS & BIVALVES WERE MORE IMPORTANT TO THE *R. ERINACEA*, BUT *R. OCELLATA* PAIR & *EUPHAUSIDS* WERE MORE IMPORTANT TO THE *R. RADIANA* PAIR. THESE DIFFERENCES MAY REFLECT DIFFERENCES IN THE BENTHIC COMMUNITIES WITH WHICH THE SPECIES-PAIRS ARE ASSOCIATED. AMOUNT OF OVERLAP IN RESOURCE UTILIZATION OF THE PAIRS OF SKATES WAS COMPARED WITH THAT OF SOME OTHER CONGENERIC ORGANISMS.

MCILWAIN, T. D. NO. 72
1970 LENGTH-WEIGHT RELATIONSHIPS OF CHAIN PICKEREL
STOMACH CONTENTS AND IN SOUTH MISSISSIPPI WATERS
(ESOX NIGER) IN TRANS AM FISH SOC 99(2): 439-440.

FOOD WAS FOUND IN 54 PERCENT OF 108 PICKEREL STOMACHS AND, ALTHOUGH 66 DIFFERENT ORGANISMS WERE EATEN BY 58 FISH, ONLY THREE STOMACHS CONTAINED MORE THAN ONE FOOD ITEM. THE THREE DOMINANT FOOD ITEMS WERE LARGEMOUTH BASS (MICROPTerus SALMOIDES), STRIPED MULLET (MUGIL CEPHALUS) AND BLUEGILL (LEPOMIS MACROCHIRUS). ALTHOUGH LARGE POPULATIONS OF SOFT-RAYED FISH SUCH AS BLACKTAIL REDHORSE (MOXOSTOMA POECILURUM) AND SHARPFIN CHUBSUCKER (CERIMYZON TENUIS) ARE PRESENT IN THESE RIVER SYSTEMS, 38.8 PERCENT OF THE IDENTIFIABLE FISH WERE CENTRARCHIDS.

MERRINGER, J.V. NO. 2³ WEAKFISH, CYNOSCIUS REGALIS, IN NORTH
FOOD HABITS OF THE WEAKFISH, CYNOSCIUS REGALIS, IN NORTH
CAROLINA WATERS
CHESAPEAKE SCI 16(1): 74-76

THE DOMINANT FOOD ITEMS IN 817 STOMACHS OF WEAKFISH COLLECTED IN
THE NORTH CAROLINA WATERS FROM 1967 TO 1970 WERE PENAEID & MYSID
SHRIMPS, ANCHOVIES, & CLUPEID FISHES. DOMINANCE OF VARIOUS FOOD
ITEMS SHIFTED DEPENDING UPON THE TECHNIQUE USED TO DESCRIBE FOOD
HABITS: PERCENT OCCURRENCE, PERCENT NUMBER, OR PERCENT VOLUME. AGE
0 WEAKFISH FED PRIMARILY ON SHRIMP & ANCHOVY IN AGE 1 FISH,
SHRIMP & ANCHOVY CONTINUED TO DOMINATE THE FOOD THOUGH OTHER
FISHES APPEARED IN THE DIET. IMPORTANCE OF SHRIMP IN THE DIET
DECREASED FROM AGE II ON. OLDER WEAKFISH FED UPON THE CLUPEID
SPECIES THAT WERE DOMINANT IN A GIVEN AREA.

MOFFETT, A.W., L.W. MCEACHERN AND J.G. KEY
NO. 70
1979 ANNOTATED BIBLIOGRAPHY FOR SAND SEATROUT, CYNOSCIUS ARENARIUS
TECH SER, TEXAS PARKS AND WILDLIFE DEPT., MARSHALL, TX 28:1-13

MOFFETT, A.W., L.W. MCEACHERN AND J.G. KEY
NO. 24
1979 OBSERVATIONS ON THE BIOLOGY OF SAND SEATROUT, *Cynoscion arenarius*
IN GALVESTON AND TRINITY BAYS, TEXAS
CONT MAR SCI 22: 163-172

SAND SEATROUT (*Cynoscion arenarius*) IS OF COMMERCIAL & RECREATIONAL IMPORTANCE TO THE GULF STATES. SPAWNING BEHAVIOR, FEEDING HABITS, LENGTH-WEIGHT RELATIONSHIPS & STANDARD LENGTH-TOTAL LENGTH RELATIONSHIPS WERE DETERMINED FOR 498 SAND SEATROUT COLLECTED BETWEEN MAY 1966 & MARCH 1968 FROM GALVESTON & TRINITY BAYS, TEXAS & FROM THE GULF OF MEXICO NEAR GALVESTON ISLAND. SAND SEATROUT DISTRIBUTION, GONADAL DEVELOPMENT & THE TIME YOUNG-OF-THE-YEAR APPEARED IN ESTUARIES INDICATED THAT THIS SPECIES SPAWNS NEAR GULF-TO-BAY PASSES IN THE GULF OF MEXICO BETWEEN MARCH & AUGUST WITH A SPawning PEAK DURING SPRING. FISH & CRUSTACEANS DOMINATED THE DIET OF SAND SEATROUT. CRUSTACEANS OCCURRED MORE FREQUENTLY IN FISH <160 MM SL & FISH PREDOMINATED IN THOSE >160 MM SL. THE LENGTH-WEIGHT REGRESSIONS DERIVED FROM 267 SAND SEATROUT FROM 125-375 MM SL DIFFERED BETWEEN SEXES. THE STANDARD LENGTH-TOTAL LENGTH RELATIONSHIP WAS $TL = 0.7 + 1.1 \text{ SL}$.

THE FACTORS INFLUENCING THE SELECTION OF FOOD BY FLOUNDERS, *COLLECTORIS* (*L.*), HAVE BEEN INVESTIGATED BY ANALYSING COLLECTIONS MADE IN THE SEVERN ESTUARY FOR 1 YEAR & THE RESULTS OF EXPERIMENTS. FLOUNDERS MEASURING BETWEEN 6.0 & 35 CM FED HEAVILY ON THE POLYCHAETE *NEREIS* DIVERTICULARIS IN FEBRUARY & ON THE AMPHIPOD *GAMMARUS SALINUS* BETWEEN FEBRUARY & APRIL THEREAFTER. THESE SPECIES WERE REPLACED BY THE MYSID NEOMYSIS INTEGRIS WITH THE DECAPOD *SCRANGON VULGARIS*. FLOUNDERS SHORTER THAN 6.0 CM, FED MAINLY ON NEOMYSIS INTEGRIS REGARDLESS OF MONTH. NUMEROUS FACTORS WERE INVOLVED IN THE CHOICE OF THE FOOD INCLUDING (1) THE MAXIMUM & MINIMUM LENGTH OF PREY, (2) ITS SPATIAL DISTRIBUTION IN THE WATER COLUMN, (3) ITS DEGREE OF CONCEALMENT, (4) ITS MOTILITY & ABILITY TO ESCAPE PREDATION, (5) CONDITIONING OF THE FLOUNDER FOR CERTAIN FOOD, (6) THE FISH'S SWIMMING SPEED & (7) THE TURBIDITY & TEMPERATURE OF THE WATER. ALTHOUGH THE AVERAGE LENGTH OF INGESTED PREY REMAINED UNCHANGED AS THE FISH GREW IN SIZE, AN INCREASE IN THE MAXIMUM & MINIMUM LENGTHS WAS OBSERVED. THE PERCENTAGE OF STOMACHS THAT CONTAINED NO IDENTIFIABLE REMAINS IN FLOUNDERS GREATER THAN 6.0 CM AVERAGED 80-95% DURING PART OF THE WINTER & 60% IN THE SUMMER & BETWEEN JANUARY & MARCH. THESE CHANGES PARTLY REFLECTED THE INFLUENCE OF LOW WATER TEMPERATURE ON THE METABOLIC RATE & AVAILABILITY OF PREY. THE DRY WEIGHT OF THE STOMACH CONTENTS IN FLOUNDERS LONGER THAN 6.0 CM WAS LOWEST IN WINTER BUT HIGH VALUES WERE RECORDED IN THE SPRING. THIS LATTER FEATURE WAS PROBABLY BECAUSE THE RATE OF FEEDING WAS GREATER THAN THAT OF DIGESTION. DURING THE SUMMER, UNDER MORE NORMAL FEEDING CONDITIONS, THE WEIGHT OF THE STOMACH CONTENTS REMAINED RELATIVELY LOW COMPARED TO OTHER FISH POPULATIONS. FLOUNDERS SHORTER THAN 6.0 CM ALWAYS CONTAINED MORE FOOD IN THEIR STOMACHS ON A UNIT WEIGHT BASIS THAN LARGER INDIVIDUALS, REFLECTING METABOLIC RATE & HUNTING EFFICIENCY.

MOORE, J. W., AND MOORE, I. A.
NO. 29
1976 BASIS OF FOOD SELECTION IN SOME ESTUARINE FISHES. EEL; ANGUILLA
ANGUILLA; WHITING; MERLANGUS; SPRAT; SPRATTUS; SPRATTUS
J. FISH BIOL 9(1): 375-350

THE FACTORS INFLUENCING THE SELECTION OF FOOD BY EELS, ANGUILLA, SPRATTUS, & SPRATTUS SPRATTUS, ANALYSING COLLECTIONS MADE IN THE SEVERN ESTUARY FOR 1 YR. NON-MI GRATORY (YELLOW) EELS MEASURING FROM 19.5-56.5 CM IN LENGTH FED MAINLY ON EITHER THE DECAPOD CRANGON VULGARIS OR ON THE MYSID NEO MYSIS INTEGERRIMA DURING THE WARMER MONTHS BUT CEASED TO FEED IN THE WINTER. WHITING MEASURING BETWEEN 2.5 & 15 CM FED ALMOST EXCLUSIVELY ON C. VULGARIS, N. INTEGRUM & THE SAND GOBY, POMATOSCHISTUS MINUTUS. SPRATS FED CHIEFLY ON EITHER THE AMPHIPOD GAMMARUS SALINUS OR N. INTEGRUM. STICKLEBACKS SELDOM CONTAINED ANY FOOD IN THEIR STOMACHS DESPITE THE PRESENCE OF LARGE QUANTITIES OF SUITABLE PREY & THE HIGH LEVEL OF HUNTING EFFICIENCY GAMMARUS SALINUS, ALTHOUGH NORMALLY ABUNDANT IN THE ENVIRONMENT, WAS USUALLY INGESTED IN DISPROPORTIONATELY SMALL QUANTITIES BY ALL FISHES EXCEPT SPRATS REFLECTING ITS CONCEALMENT (LESS THAN 1 CM) ORGANISMS. BECAUSE OF THE LIMITATIONS OF SIZE & THE UNUSUALLY EFFICIENT ESCAPE REACTION OF LARGER ANIMALS, ONLY YOUNG REPRESENTATIVES OF CRANGON VULGARIS WERE CAPTURED. THE ISOPOD EURYDICE PULCHRA WAS RARELY EATEN BY ANY OF THE FISHES EVEN THOUGH IT WAS COMMON IN THE ENVIRONMENT. BURROWING POLYCHAETES, MAINLY NEREIS DIVERSICOLOR, WERE NEVER UTILIZED POSSIBLY DUE TO THE DIFFICULTY INVOLVED IN REMOVING THESE ORGANISMS FROM THE SUBSTRATE. NEOMYSIS INTEGGER WAS THE MOST FREQUENTLY CONSUMED ORGANISM ALTHOUGH THE AVERAGE LENGTH OF PREY INGESTED BY THE WHITINGS INCREASED WITH THE SIZE OF FISH, THIS WAS NOT THE CASE FOR THE OTHER SPECIES. CONTENTS OF THE STOMACHS OF EELS & THE DRY WEIGHT OF THE OTHER SPECIES DEPENDED ON THE TEMPERATURE OF THE WATER BUT WERE NOT RELATED TO THE AVAILABILITY OF PREY & TIDAL CONDITIONS WHEREAS THE FEEDING OF WHITING COULD NOT BE RELATED TO ANY ENVIRONMENTAL PARAMETER.

MULKANA, M. S.

NO. 30
1966 GROWTH AND FEEDING HABITS OF JUVENILE FISHES IN TWO RHODE
ISLAND ESTUARIES
GULF RES REP 2(2): 97-168

THE BASIC PURPOSE OF THIS WORK WAS TO GAIN INFORMATION ON THE POSSIBLE ROLE OF SOME RHODE ISLAND ESTUARIES AS NURSERY GROUNDS FOR YOUNG MIGRANT & RESIDENT SPECIES OF FISHES. THE AREAS SELECTED WERE THE LOWER PETTAQUAMSCUTT RIVER & THE LOWER POINT JUDITH POND BOTH IN THE LOWER TOWN OF NARRAGANSETT, RHODE ISLAND. THE SEINING OPERATIONS WERE CARRIED THROUGH SUMMER & EARLY FALL OF 1962 WHEN THESE ESTUARIES ARE HEAVILY USED AS NURSERY GROUNDS. MAJOR FEATURES OF THE OCCURRENCE, ABUNDANCE & DISTRIBUTION OF YOUNG FISHES WERE DUCED BY EXAMINING SAMPLES FROM SEINE HAULS. THIRTY-SIX SPECIES WERE RECORDED FROM THE LOWER RIVER WHILE ONLY TWENTY-FOUR SPECIES OCCURRED IN THE LOWER POND. THE ABUNDANCE OF FISHES ROSE WITH A RISE IN TEMPERATURE & DECLINED WITH DECREASING TEMPERATURE, BUT NO CORRELATION WAS OBSERVED BETWEEN MAXIMUM TEMPERATURE & MAXIMUM NUMBER OF INDIVIDUALS OCCURRING AT ANY TIME. THE NUMBER OF SPECIES & THE ABUNDANCE OF INDIVIDUAL FISH WERE HIGHEST AT THE SEWARD STATION (STA. II) IN THE LOWER RIVER. AMONG THE SELECTED SPECIES, THE ABUNDANCE OF MENIDIA WAS TWO TIMES HIGHER AT STA. II THAN AT ANY OTHER STATION. THE BEHAVIOR OF MIDDLE BRIDGE (STA. III) WAS SIMILAR TO STA. II. THE BEHAVIOR OF PSEUDOPLEURONECTES AMERICANUS, FOUND PRIMARILY AT SEWARD STATION, & THE MIGRANT SPECIES BREVOORTIA TYRANNUS OBSERVED AT LANDWARD STATIONS, IS DISCUSSED. THE SPECIES P. AMERICANUS GREW AT THE RATE OF 10 MM. PER MONTH, BUT EXHIBITED NO VARIATION IN GROWTH IN THE TWO ESTUARINE SYSTEMS. THE POPULATIONS OF B. TYRANNUS FROM THE LOWER PETTAQUAMSCUTT RIVER HAD A GROWTH RATE THAT WAS ALMOST TWICE THAT OF POPULATIONS IN THE LOWER POINT JUDITH POND. THE GROWTH RATE OF THESE SPECIES IN RHODE ISLAND WATERS COMPARE FAVORABLY WITH SIMILAR DATA FROM OTHER STUDIES. THE JUVENILE M. MENIDIA DEMONSTRATED A HIGHER RATE OF GROWTH AT SEWARD STATIONS IN BOTH THE AREAS, ESPECIALLY IN THE LOWER RIVER. FORTY-THREE TYPES OF PREY ORGANISMS BELONGING TO DIVERSE TAXONOMIC GROUPS WERE IDENTIFIED FROM STOMACH CONTENTS OF P. AMERICANUS & THIRTY-NINE TYPES WERE NOTED IN THE GUT CONTENTS OF M. MENIDIA. ANALYSIS OF THE DEGREE OF FULLNESS INDICATED MARKEDLY HIGH PERCENTAGE OF FULL STOMACHS IN THE TWO STUDY AREAS. *

NAQVI, S.M.Z. NO⁶⁰
1963 EFFECTS OF PREDATION ON INFANAL INVERTEBRATES OF ALLIGATOR
HARBOR, FLORIDA REP 2: 213-321

A STUDY OF THE EFFECT OF PREDATION ON INFANAL INVERTEBRATES WAS CARRIED OUT FROM JULY 1965, TO JANUARY 1966, WITHIN THE CINTERTIDAL ZONE OF FLORIDA STATE UNIVERSITY MARINE LABORATORY AREA AT ALLIGATOR HARBOR, LOCATED ON THE NORTHEAST GULF OF MEXICO. THE ANIMALS WERE OFFERED PROTECTION BY WIRE-BASKETS OF THREE DIFFERENT MESH SIZES. OUT OF 1,112 INFANAL INVERTEBRATES, 800 WERE RECOVERED INSIDE & 312 OUTSIDE THE BASKETS. THE POLYCHAETES, NEMERTINES, PHORONIDS, AMPHIPODS & BIVALVES MADE UP THE INFANIA; THE POLYCHAETES COMPRISED THE MAJOR PART OF IT. OUT OF 34 SPECIES OF POLYCHAETES, SIX ARE REPORTED FROM THIS AREA FOR THE FIRST TIME. THE SPAWNING PERIOD OF TWO SPECIES OF POLYCHAETES & ONE GASTROPOD WAS ALSO OBSERVED, & THE SEASONAL ABUNDANCE OF ALL POLYCHAETES WAS NOTED. THE DEPTH PREFERENCE OF INFANAL ORGANISMS WAS DETERMINED.

ODUM, W.E. NO. 31 SIGNIFICANCE OF FINE PARTICLE SELECTION BY THE

1968 ECOLOGICAL STUDY
THE STRIPED MULLET, *MUGIL CEPHALUS*.
LIMNOL OCEANOGR. 13(1): 92-98

BY TRACER EXPERIMENTS USING P & A COMPARISON OF SEDIMENT & STOMACH
CONTENT PARTICLE SIZES, MUGIL CEPHALUS LINNEUS IS SHOWN TO PREFER
VERY FINE PARTICLES WHEREVER SEDIMENTS ARE INVOLVED IN FEEDING.
IT IS SUGGESTED THAT THESE SMALL INORGANIC & PLANT DETRITAL SEDI-
MENT PARTICLES ARE MUCH RICHER BOTH IN ABSORBED ORGANIC MATERIAL
& IN ADSORBED BACTERIA, PROTOZOA, & OTHER MICROORGANISMS THAN THE
COARSER MATERIAL THAT THE MULLET REJECTS. THIS SELECTIVITY RESULTS
IN SUBSTANTIALLY HIGHER ORGANIC VALUES OF THE STOMACH CONTENTS
THAN OF THE SEDIMENTS.

OVERSTREET, R.M. AND R.W. HEARD
1978. NO 33
FOOD OF THE ATLANTIC CROAKER, *MICROPOGONIAS UNDULATUS*, FROM
MISSISSIPPI SOUND AND THE GULF OF MEXICO
GULF RES REP 6(2): 145-152

THE DIET OF THE ATLANTIC CROAKER FROM MISSISSIPPI SOUND HAS BEEN
EXAMINED FOR THE FIRST TIME. OVER 83 TAXA WERE ENCOUNTERED, OR
MORE THAN WERE REPORTED FROM CROAKER IN ANY OTHER REGION. WE ALSO
FOUND 60 TAXA, 36 OF WHICH OVERLAPPED WITH THE ABOVE, IN CROAKER
FROM VARIOUS OFFSHORE STATIONS IN THE GULF OF MEXICO. IN MISS. CRUS
SOUND THE FREQUENCY OF OCCURRENCE OF ITEMS REVEALED PRIMARILY CRUS
TACEANS FOLLOWED BY POLYCHAETES, MOLLUSCS, FISHES, & LESS COMMON
ITEMS, & IN THE OPEN GULF MOLLUSCS APPEARED SLIGHTLY MORE OFTEN
THAN IN INSHORE CROAKER & THAN POLYCHAETES IN OFFSHORE FISH. THE
DIETS WERE ASSESSED ACCORDING TO LENGTH OF FISH, SEASON, DEPTH OF
WATER, & LOCALITY.

OVERSTREET, R. M., AND R. W. HEARD
NO. 32
1978.
FOOD OF THE RED DRUM, SCIAENOP-
ES REP 6(2): 131-135
GULF

PARKER, J. C.

NO. 82
1971. BIOLOGY OF THE SPOT (*LEIOSTOMUS XANTHURUS*) AND ATLANTIC CROAKER
(*MICROPOGON UNDULATUS*) IN TWO GULF OF MEXICO NURSERY AREAS
AGRI-EXT SERV TEXAS A&M UNIV. SEA GRANT PUB TAMU-56-71-210

THE DISTRIBUTION OF SPOT AND ATLANTIC CROAKER IN THE VICINITY OF LAKE BORGNE, LOUISIANA AND GALVESTON BAY, TEXAS WAS DETERMINED IN RELATION TO TEMPERATURE, SALINITY, AND CERTAIN HYDROGRAPHIC FEATURES. GEOGRAPHIC VARIATIONS IN SPAWNING, GROWTH RATES, DISTRIBUTION AND FOOD HABITS WERE EVALUATED. LENGTH-WEIGHT RELATIONSHIPS WERE COMPARED BETWEEN THE TWO AREAS, AND IN GALVESTON BAY, CONDITION OF FISH WAS STUDIED IN RELATION TO SIZE OF FISH. HABITAT, SEASON, TEMPERATURE, AND SALINITY COMPETITION FOR SPOT AND CROAKER WERE FOUND TO BE IN DIRECT PROPORTION WHICH THIS COMPETITION OCCURRED IN BOTH STUDY AREAS. THE DEGREE TO WHICH THIS COMPETITION AFFECTS THE ABUNDANCE OF THESE SPECIES IS NOT KNOWN. IN THE LAKE BORGNE AREA, SPOT WERE MORE ABUNDANT THAN CROAKERS IN SUBAREA III, ABUNDANCE WAS ABOUT EQUAL IN SUBAREA II, AND CROAKER WERE MORE ABUNDANT THAN SPOT IN SUBAREA I. THE NUMBER AND BIOMASS OF CROAKER IN GALVESTON BAY FAR EXCEEDED THAT SPOT THROUGHOUT THE SYSTEM. IT WAS NOT POSSIBLE TO DETECT THE FACTORS RESPONSIBLE FOR THESE DIFFERENCES, BUT AVAILABILITY OF FOOD MUST SURELY HAVE BEEN INVOLVED. *

PEARCY, W.G. AND D. NO. 67
1978 FEEDING HABITS OF MICROSTOMUS PACIFICUS; GLYPTOCEPHALUS ZACHIRUS;
AND CITHARICHTHYS SORDIDUS, IN A REGION OF DIV. SED. AND BATHYMETRY
FISH BULL 76(3): 641-651

THE FEEDING HABITS OF THE DOVER SOLE & REX SOLE (MAINLY JUVENILES) & OF SLENDER SOLES & PACIFIC SANDDAB WERE INVESTIGATED AT SEVEN STATIONS ON THE CONTINENTAL SHELF OFF CENTRAL OREGON. DOVER SOLE HAD A CATHOLIC DIET, FEEDING ON A LARGE VARIETY OF INFAUNAL & EPIFAUNAL INVERTEBRATES. THE COMPOSITION TYPE OF THE DIET VARIED AMONG STATIONS OF DIFFERENT DEPTH & SEDIMENT TYPE INDICATING OPPORTUNISTIC FEEDING. PELECYPODA WERE THE MOST IMPORTANT PREY ON A WEIGHT BASIS AT THE SHALLOW STATION (74M) OF WELL-SORTED SAND WHERE THEY WERE THE DOMINANT MACROFAUNAL INVERTEBRATE. OPHIUROIDS, SEA PENS, ANEMONES & PELECYPODS WERE THE MOST IMPORTANT PREY AT 100-102M STATIONS OF SILTY SAND OR SANDY SILTS. POLYCHAETES COMPOSED OVER 90% OF THE DIET AT THE DEEP STATIONS (148-195M) OF CLAYEY SILT OR SILTY SAND. THE AVERAGE STANDING STOCKS PER SQUARE METER OF DOVER SOLE CAUGHT IN BEAM TRAWL COLLECTIONS & POLYCHAETES IN GRAB SAMPLES WERE POSITIVELY CORRELATED AMONG STATIONS. SIMILARITY OF THE FOOD HABITS OF DOVER SOLE ON THE BASIS OF FOOD WEIGHT OR FREQUENCY OF OCCURRENCE WAS GENERALLY HIGHER AMONG STATIONS OF SIMILAR DEPTH THAN ASSEMBLAGES OF BENTHIC FISHES & SIMILAR TRENDS WERE NOTED FOR DOVER SOLE COLLECTED DURING THE WINTER HAD THE HIGHEST PERCENTAGE OF EMPTY STOMACHS, THE FEWEST PREY TAXA, & OFTEN THE LOWEST FREQUENCY OF OCCURRENCE OF PREY TAXA WITHIN A SIZE GROUP. BECAUSE SEASONAL VARIATIONS WERE NOT OBSERVED IN ABUNDANCE OF MACROFAUNAL FOOD IN THE SEDIMENTS, AVAILABILITY OF PREY MAY CHANGE WITH SEASON, OR MORE LIKELY, DOVER SOLE FEED MORE INTENSELY & LESS SELECTIVELY DURING SUMMER. SMALL (<150MM STANDARD LENGTH) REX SOLE FEED MAINLY ON AMPHIPODS & OTHER CRUSTACEANS. POLYCHAETES (150-450MM STANDARD LENGTH) REX SOLE PREYED CHIEFLY ON POLYCHAETES. THE DIET OF REX SOLE WAS LESS DIVERSE THAN THAT OF THE DOVER SOLE & OVERLAP OF DIET BETWEEN THE TWO SPECIES WAS NOT LARGE. BOTH THE PACIFIC SANDDAB, NUMERICALLY THE MOST COMMON SPECIES OF FISH AT THE SHALLOW SAND STATION, & THE SLENDER SOLE, THE MOST COMMON SPECIES AT THE THREE DEEP, SOFT-SEDIMENT STATIONS, PREYED PRINCIPALLY ON PELAGIC CRUSTACEANS SUCH AS EUPHAUSIIDS,

PETERS, P.S. AND M.A. KJELSON
1975 NO. 34
CONSUMPTION AND UTILIZATION OF FOOD BY VARIOUS POST LARVAL AND
JUVENILE FISHES OF NORTH CAROLINA ESTUARIES
CRONIN, L.E. (ED) ESTUARINE PERS., ACADEMIC PRESS 1:448-472

FISH PRODUCTIVITY MAY BE LIMITED BY A VARIETY OF FACTORS INCLUDING DIET COMPOSITION, INGESTION RATE, & PHYSICAL OR CHEMICAL CHARACTERISTICS OF THE ENVIRONMENT. WE MEASURED INGESTION RATE & DIET COMPOSITION IN MENHADEN (*BREVOORTIA TYRANNUS*), SPOT (*LEIOSTOMUS XANTHURUS*), & PINFISH (*LAGODON RHOMBOIDES*) & GROWTH RATES & FOOD CONVERSION EFFICIENCY IN FLOUNDER (*PARALICHTHYS LETHOSTIGMA*). THE SUMMER DIETS OF JUVENILE MENHADEN, SPOT, & PINFISH AVERAGED 60% - 50% ASH. THE FOOD INGESTED DIFFERED TAXONOMICALLY BETWEEN SPECIES, BUT THE NITROGEN & CALORIC CONTENT OF THE ORGANIC MATTER INGESTED BY MENHADEN WAS PROBABLY SIMILAR. MUCH OF THE NITROGEN INGESTED BY MENHADEN WAS PROBABLY IN THE FORM OF MICROBES. THE DAILY RATIONS OF POSTLARVAL & JUVENILE PINFISH, SPOT, & MENHADEN WERE ESTIMATED FROM DATA DESCRIBING DIET PERIODICITY OF GUT CONTENTS & GASTROINTESTINAL CONTENTS WERE DETERMINED IN THE EVACUATION RATE. EVAQUATION RATE CONSTANTS WERE DETERMINED IN THE LABORATORY & USED TO ESTIMATE AVERAGE EVACUATION RATE UNDER NATURAL FEEDING CONDITIONS. HIGH VARIABILITY IN GUT CONTENT OF POSTLARVAL FISH CAUSED IMPRECISE ESTIMATES OF THEIR DAILY RATIONS. FEEDING & GROWTH RATES OF JUVENILE SOUTHERN FLOUNDER WERE HIGHEST AT HIGH TEMPERATURES & LOW SALINITIES. THE SALINITY-PRODUCING MAXIMUM CONVERSION EFFICIENCY INCREASED AS TEMPERATURE DECREASED. OPTIMUM FEEDING RATE FOR MAXIMUM EFFICIENCY WAS APPROXIMATELY 70%-90% AD LIBITUM FEEDING & WAS RELATIVELY UNAFFECTED BY TEMPERATURE. MIGRATION OF SUMMER FLOUNDER, SOUTHERN FLOUNDER, & HOGCHOKER MAY BE TOWARD TEMPERATURE-SALINITY CONDITIONS UNDER WHICH MAXIMUM GROWTH RATES OCCUR.

POWELL, A.B. AND F.J. SCHWARTZ
NO. 46
1979. FOOD OF PARALICHTHYS DENTATUS AND P. LETHOSTIGMA (PISSES: BOTHIIDAE)
IN NORTH CAROLINA ESTUARIES
ESTUARIES 2(4): 276-279.

THE DIETS OF THE SPATIALLY SEGREGATED SUMMER FLOUNDER, *P. LETHOSTIGMA*, IN
PARALICHTHYS DENTATUS, & SOUTHERN FLOUNDER, *P. LETHOSTIGMA*, &
PAMLICO SOUND, NORTH CAROLINA, WERE COMPOSED OF CRUSTACEANS &
FISHES. YOUNG FLOUNDERS FED MAINLY ON MYSIDS & FISHES THROUGHOUT
THE YEAR, BUT THE RATIONS OF THESE ITEMS DIFFERED BETWEEN SPECIES.
FEEDING WAS MINIMAL DURING WINTER, BUT SUMMER FLOUNDER FROM OLDER
INLET STATIONS HAD A HIGH FREQUENCY OF STOMACHS WITH FOOD. WHILE SOUTHERN
SUMMER FLOUNDER FED EQUALLY ON SHRIMP & FISHES, WHILE SOUTHERN
FLOUNDER FED ALMOST SOLELY ON FISHES. THIS DIFFERENCE WAS PROBABLY
RELATED TO FOOD AVAILABILITY.

RICHARDS, S.W.

NO. 6
1976. GROWTH, AND FOOD OF BLUEFISH (*POMATOMUS SALTRATRIX*) FROM
EAST-CENTRAL LONG ISLAND SOUND FROM JULY THROUGH NOVEMBER 1975
TRANS AM FISH SOC 105(4): 523-525.

AGE & GROWTH WERE ANALYZED FROM SCALES OF 64 BLUEFISH TAKEN FROM
EAST-CENTRAL LONG ISLAND SOUND DURING MID-JULY TO MID-NOVEMBER
1975. AGES RANGED FROM 2+ TO 7+ YEARS; FORK LENGTHS RANGED FROM 44
TO 76 CM. NO CONSISTENT DIFFERENCES WERE NOTED BETWEEN THE SEXES.
BACK-CALCULATIONS FROM SCALE READINGS INDICATED THAT MEAN FOR
LENGTHS, IN CENTIMETERS, FOR EACH YEAR WERE: 23 AT 1+ YEAR; 40 AT
2+ YEARS; 49 AT 3+; 48 AT 4+; 64 AT 5+; 69 AT 6+; & 71 AT 7+ YEAR.
WEIGHT IN GRAMS DOUBLED FROM 1,800 AT 3+ YEARS TO 4,100 AT 5+
YEARS, INCREASING TO 5,500 AT 7+ YEARS. SIXTY-SEVEN BLUEFISH ATE
LOLIGO PEALI (SQUID) & SEVEN SPECIES OF FISH: BREVOORTIA TYRANNUS,
ANCHOA MITCHILLI, PEPRILUS TRIACANTHUS, ETTRUMEUS TERES, ALOSA
PSEUDOHARENGUS, MERLUCCIUS BILINEARIS, & *POMATOMUS SALTRATRIX*. WITH
THE EXCEPTION OF MENHADEN, ALL PREY WERE OF SMALL SIZE, RANGING IN
LENGTH BETWEEN 5 & 20 CM.

RICHARDS, S.W., J.M. MANN AND J.A. WALKER
 1979. COMPARISON OF SPAWNING SEASONS, AGE, GROWTH RATES, AND FOOD OF
 TWO SYMPATRIC SPECIES OF SEAROBINS, PRIONOTUS CAROLINUS
 ESTUARIES 2(4): 255-268

PRIONOTUS CAROLINUS & PRIONOTUS EVOLANS WERE COLLECTED FROM MANY LOCATIONS WITHIN LONG ISLAND SOUND IN 1971-1973, & IN 1976-1977. DATA FROM EARLIER COLLECTIONS IN BLOCK ISLAND SOUND (1943-1945) WERE ALSO INCLUDED. A TOTAL OF 1751 SPECIMENS, 960 P. CAROLINUS & 791 P. EVOLANS, WERE EXAMINED WITHIN THESE TWO TIME PERIODS. BOTH SPECIES ENTERED THE SOUND IN APRIL & SPAWNED DURING JUNE & JULY. P. EVOLANS APPEARED TO SPAWN SLIGHTLY EARLIER IN SUMMER THAN P. CAROLINUS. ADULTS BEGAN TO LEAVE THE SOUND AFTER SPAWNING & WERE USUALLY ABSENT AFTER NOVEMBER YOUNG-OF-THE-YEAR WERE TAKEN REGULARLY FROM AUGUST TO NOVEMBER & OCCASIONALLY IN WATER OVER 20M DEEP, INTO FEBRUARY WHEN THE BOTTOM WATER TEMPERATURE WAS 14°C. AT THE END OF THE FIRST GROWING SEASONS BOTH SPECIES EXHIBITED LARGE VARIATIONS IN STANDARD LENGTH BACK-CALCULATIONS FROM SCALE ANNULI MEASUREMENTS INDICATED THAT LINEAR GROWTH RATES DURING THE JUVENILE YEARS WERE SIMILAR IN BOTH SPECIES. HOWEVER P. EVOLANS WAS CONSIDERABLY HEAVIER THAN P. CAROLINUS. DURING ADULTHOOD P. EVOLANS WAS NOT ONLY LONGER & HEAVIER THAN P. CAROLINUS, BUT LIVED LONGER. GROWTH RATES ARE DESCRIBED BY THE FOLLOWING EQUATIONS: P. CAROLINUS $L_{T+1} = 9.60 + 0.68(L_T)$, & P. EVOLANS $L_{T+1} = 7.70 + 0.80(L_T)$. BOTH SPECIES WERE OPPORTUNISTIC FEEDERS, & CRUSTACEANS WERE CLEARLY THE DOMINANT GROUP OF PREY. YOUNG-OF-THE-YEAR, BETWEEN 3-6CM, ATE COPEPODS AS THEY GREW. THEY ATE LARGER PREY, SUCH AS NEOMYSIS AMERICANA, DIASTYLIS QUADRISPINOSUS, VARIOUS SPECIES OF AMPHIPODS OF SMALL SIZES, & JUVENILE CRANGON SEPTEMSPINOSUS. OLDER FISH ATE LARGER SIZES OF THESE SAME PREY, A NUMBER OF SPECIES OF CRABS, THEY JUVENILE HOMARUS AMERICANUS, & SQUILLA ENPUZA. OCCASIONALLY THEY ATE POLYCHAETES, MOLLUSCS, & JUVENILE FISH. PARTITIONING OF THE RESOURCES OF LONG ISLAND SOUND BY THESE TWO SPECIES APPEARED TO BE BY PREY SIZE. P. EVOLANS ATE PREY THAT, ON THE AVERAGE, WERE SLIGHTLY LARGER THAN THOSE EATEN BY P. CAROLINUS. FURTHERMORE, P. EVOLANS ATE A GREATER AMOUNT OF NEKTONIC SPECIES THAN P. CAROLINUS WHICH APPEARED TO PREFER BENTHONIC INVERTEBRATES.

RINGLER, N.H.

NO. 73
1978. SELECTION BY BENTHIC FEEDERS
STROUD&CLEPPER(EDS) SYMP PRED-PREY SYST FISH MGMT, ATL, GA: 219-229

PREY SIZE, DISTRIBUTION AND ABUNDANCE PLAY A CENTRAL ROLE IN DIET SELECTION. OPTIMAL FORAGING THEORY PROVIDES GENERAL PREDICTIONS OF PREY SUITABILITY IN TERMS OF TIME OR ENERGY, AND SUCH PREDICTIONS PROVIDE GUIDANCE IN STUDIES OF PROXIMATE MECHANISMS OF PREY SELECTION. CONSIDERABLE EVIDENCE SUGGESTS THAT BENTHIC FEEDERS ARE SIZE-SELECTIVE. THEY ALSO APPEAR CAPABLE OF LOCATING AREAS OF PREY-ABUNDANCE, AND FORAGING BEHAVIOR MAY BE CONTROLLED BY A CRITICAL RATE OF FOOD CAPTURE. SELECTIVE PREDATION HAS BEEN SHOWN TO INCREASE FOOD INTAKE RELATIVE TO RANDOM FEEDING, ALTHOUGH SEVERAL DAYS MAY BE REQUIRED TO LEARN THE APPROPRIATE RESPONSE. ENVIRONMENTAL FACTORS INFLUENCE PREY SELECTION BY BENTHIC FEEDERS. RATES OF GASTRIC EVACUATION AND FORAGING ACTIVITY INCREASE WITH TEMPERATURE IN FISHES AS DOES THE DEGREE OF EXPOSURE OF AQUATIC INVERTEBRATES. INDIVIDUAL FISH MAY BECOME ACCUSTOMED TO FEEDING WITHIN NARROW LIMITS OF TEMPERATURE AND DISSOLVED OXYGEN WHICH ACTS TO PARTITION THEIR FEEDING IN TIME AND SPACE. THE COMPLEXITY OF BENTHIC ENVIRONMENTS HAS BEEN SHOWN TO INFLUENCE PREDATION INTENSITY AND EXTENT OF SIZE SELECTIVITY.*

ROELOFS, E. W.
1954. FOOD STUDIES OF YOUNG SCIAENID FISHES, MICROPOGON AND LEIOSTOMUS
FROM NORTH CAROLINA
COPEIA 1954(2): 151-153

FOOD HABITS OF YOUNG ATLANTIC CROAKER, MICROPOGON UNDULATUS, AND
SPOT, LEIOSTOMUS XANTHURUS, WERE EXAMINED FOR SPECIMENS IN THE
PAMLICO SOUND ESTUARY. CROAKERS FEED PRIMARILY ON POLYCHAETES AND
COPEPODS, WHEREAS SPOT FEED ON NEMATODES AND PLANT MATERIAL IN
ADDITION TO POLYCHAETES AND COPEPODS. DIFFERENCES IN FOOD HABITS
WERE RELATED TO FEEDING BEHAVIOR AND MORPHOLOGY OF THE GILL
RAKERS.*

ROGERS, R. M.

NO. 80
1977. TROPHIC INTERRELATIONSHIPS OF SELECTED FISHES ON THE CONTINENTAL SHELF OF THE NORTHERN GULF OF MEXICO
PHD DISSERTATION, TEXAS A&M UNIV 229PP

THE PRESENT STUDY SURVEYS THE TROPHIC INTERRELATIONSHIPS OF 26 DEMERSAL FISHES INHABITING THE CONTINENTAL SHELF OF THE NORTHERN GULF OF MEXICO. VOLUMETRIC STOMACH CONTENT ANALYSES WERE CARRIED OUT ON 4,550 SPECIMENS. FISHES WERE COLLECTED AT 128 STATIONS BETWEEN BROWNSVILLE, TEXAS AND ST. ANDREW'S BAY, FLORIDA. DEPTHS OF APPROXIMATELY 3' TO 200 METERS. WITHIN EACH SPECIES, FISH WERE GROUPED BY SIZE, DEPTH, AND GEOGRAPHICAL LOCATION IN ORDER TO COMPARE VARIATIONS IN FOOD HABITS DUE TO THESE FACTORS. FOOD HABITS OF THE INDIVIDUALS SPECIES ARE DISCUSSED EMPHASIZING TRENDS IN DIET BY FOOD CATEGORIES, WITH GEOGRAPHICAL LOCATION FEEDING, AND VARIATIONS ASSOCIATED WITH THOSE SPECIES WHERE DATA WERE AVAILABLE. FROM THIS DETAILED INFORMATION, TRENDS IN THE LIFE HISTORY AND FOOD HABITS OF CONTINENTAL SHELF FISHES ARE PROPOSED. PERIODICITY IS DISCUSSED FOR THOSE SPECIES WHERE DATA WERE AVAILABLE. FROM THIS DETAILED INFORMATION, TRENDS IN THE LIFE HISTORY AND FOOD HABITS OF A SPECIES ARE INDICATED TO SPAWN IN DEEPER WATERS. LARVAL AND JUVENILE FISHES SUBSEQUENTLY ENTER THE WATER COLUMN, ESPECIALLY THE SUPRA-BENTHIC ZONE, WHERE THEY UNDERGO A PLANKTONIC STAGE AS THEY ARE TRANSPORTED BY CURRENTS TOWARD SHALLOWER WATERS. THEY EVENTUALLY SETTLE TO THE BOTTOM TO LEAD A DEMERSAL EXISTENCE. GRADUALLY MOVING OFFSHORE TO COMPLETE THE LIFE CYCLE. THIS TREND IN LIFE HISTORY PATTERN IS REFLECTED IN THE ONTOGENETIC FOOD HABIT TRANSITIONS. LARVAE AND JUVENILES FEED LARGELY ON ZOOPLANKTON. THE IMPORTANCE OF ZOOPLANKTON DECREASES WITH ONTOGENETIC DEVELOPMENT EXCEPT IN CERTAIN PLANKTIVOROUS SPECIES. AS THE IMPORTANCE OF ZOOPLANKTON DECREASES, BENTHIC ORGANISMS INCREASE IN IMPORTANCE. SOME SPECIES REMAIN BENTHIC FEEDERS THROUGHOUT THEIR LIFE CYCLE WHILE IN OTHERS, THE CONTRIBUTION OF BOTTOM ANIMALS DECREASES, AND THEY ARE REPLACED IN THE DIET BY LARGER MACROCRUSTACEANS AND MACROMOBILE ORGANISMS. THESE HIGHER PREDATORS FEED IN THE WATER COLUMN ON ACTIVELY SWIMMING PREY. *

ROSS, S. T.
1977. NO. 35
PATTERNS OF RESOURCE PARTITIONING IN SEAROBINS,
PIGELLA: TRIGLIDAE
COPEIA 1977(3): 561-571

EIGHT SPECIES OF SEAROBINS ARE COMMON ON THE WEST FLORIDA SHELF BETWEEN TAMPA & FORT MYERS. ALL HAVE THE SAME MOUTH SHAPE; THE PRINCIPAL DIFFERENCES BETWEEN SPECIES ARE RELATIVE MOUTH SIZE & ADULT BODY SIZE. CLUSTER ANALYSIS OF SEAROBINS BASED ON PREY SIMILARITY INDICATED TWO PRINCIPAL SPECIES GROUPS CORRESPONDING IN PART TO INSHORE & OFFSHORE DISTRIBUTION PATTERNS. SEAROBINS SHOWED TWO ADULT FEEDING MODES BASED ON PREY SIZE UTILIZATION. A "SCITULUS" MODE WAS SHOWN BY *PRIONOTUS SCITULUS*, *BELLATOR MILITaris*, *P. MARTIS* & *P. ROSEUS*, IN WHICH AT LEAST 70% OF THE ADULT DIET WAS MADE UP OF PREY 10 MM OR SMALLER. A "TRIBULUS" MODE WAS SHOWN BY *P. ALATUS*, *P. TRIBULUS*, *P. OPHRYAS* & *P. SALMONICOLOR*, IN WHICH PREY LARGER THAN 10 MM MADE UP 66% OF THE ADULT DIET. "SCITULUS" MODE PREDATORS HAD SIGNIFICANTLY GREATER PERCENT RELATIVE ABUNDANCES THAN "TRIBULUS" MODE PREDATORS. THE DOMINANT METHOD OF RESOURCE PARTITIONING WAS MACROPHAGIT PARTITIONING AT HIGH LEVELS OF OVERLAP THERE WAS EVIDENCE OF PARTITIONING BY PREY SIZE.

ROSS, S.T. NO. 45
1978. TROPHIC ONTOGENY OF THE LEOPARD SEAROBIN, PRIONOTUS SCITULUS
(PISES:TRIGLIDAE)
FISH BULL 76(1): 225-235.

ONTOGENETIC FEEDING CHANGES OF THE LEOPARD SEAROBIN, PRIONOTUS SCITULUS, FROM TAMPA BAY, FLA., SHOWED A SHIFT FROM PLANKTONIC & EPIFAUNAL PREY IN SMALL FISH TO INFANAL PREY IN LARGER FISH. SMALLER FISH UTILIZED LARVAL CRUSTACEANS, NATANTIANS, BRACHYURANS, CUMACEANS, COPEPODS, & GAMMARID AMPHIPODS WHILE LARGER FISH SHOWED INCREASING RELIANCE ON THE LANCELET, BRANCHIOSOMA FLORIDA, WITH BIO-MASS & LINEAR DIMENSIONS OF PREY INCREASED EXPONENTIALLY WITH FISH SIZE FOR LARGER FISH, BUT WERE RELATIVELY CONSTANT FOR SMALL FISH. RELATIVE PREY BIOMASS WAS LOWEST FOR INTERMEDIATE-SIZED PREDATORS SCITULUS (65-95 MM) & INCREASED FOR BOTH LARGE & SMALL PREDATORS SO THAT SMALL INDIVIDUALS WERE MOST SIMILAR TO VERY LARGE FISH IN TERMS OF RELATIVE PREY SIZE. THE SWITCH TO LARGER PREY WAS PRECEDED BY RAPID INCREASES IN MOUTH SIZE & INTESTINAL LENGTH, & WAS FOLLOWED BY ATTAINMENT OF MINIMUM REPRODUCTIVE SIZE & GREATER BODY WEIGHT PER UNIT LENGTH. SPATIAL & TROPHIC PARTITIONING APPEARED QUITE EFFICIENT IN REDUCING POTENTIAL INTRASPECIFIC COMPETITION.

ROUSSEL, J.E. AND R.H. KILGEN
1975. NO. 64
FOOD HABITS OF YOUNG ATLANTIC CROAKERS (*MICROPOGON UNDULATUS*) IN
BRACKISH PIPELINE CANALS
LOUISIANA ACAD SCI 38: 70-74.

STOMACH CONTENTS OF 50 YOUNG ATLANTIC CROAKERS TRAPPED IN CLOSED-OFF BRACKISH-WATER PIPELINE CANALS IN LAFOURCHE PARISH, LOUISIANA INDICATED THAT THEIR DIET CONSISTED OF DETRITUS, MYSID SHRIMP, INSECTS, OSTRACODS & COPEPODS, FISHES & CRABS, AMPHIPODS & ISOPODS, ANNELIDS & MOLLUSCS.

SCHWARTZ, F. J. ET AL NO. 83
FOOD ANALYSES OF SELECTED FISHES CAPTURED IN CAPE FEAR ESTUARY
1980. AND ADJACENT ATLANTIC OCEAN, NORTH CAROLINA, 1973-1978
INST MAR SCI UNIV NC 254 PP

EXTENSIVE ANALYSES OF STOMACH CONTENTS FOR 11 COMMON FISHES IN THE CAPE FEAR ESTUARY AND ADJACENT OFFSHORE WATERS WERE CONDUCTED DURING 1973-1978. SPECIES STUDIED WERE SPOT (CLEISTOSTOMUS XANTHURUS), ATLANTIC CROAKER (*MICROPOGONIAS undulatus*), SOUTHERN KINGFISH (*MICROPOGONIAS undulatus*), SILVER PERCH (*Bairdiella chrysoura*), (Menticirrhus americanus), SILVER PERCH (*Bairdiella chrysoura*), CLARIMUS fasciatus), BANDED DRUM (*Clarimus fasciatus*), GREY TROUT (*Cynoscion regalis*), PINNIFISH (*Clagodon rhomboides*), STAR DRUM (*Stellifer lanceolatus*), PARALICHTHYS (PARALICHTHYS), SUMMER FLounder (*Paralichthys dentatus*), SPOTTED HAKE (*Europhycis regius*), SUMMER FLounder (*Paralichthys dentatus*), SUMMER FLounder (*Paralichthys dentatus*), ANCHOA MITCHELLI (*Anchoa mitchilli*). THESE SPECIES WERE FOUND TO PARTITION THE AVAILABLE HABITAT & FOOD RESOURCES AS A RESULT OF THEIR DIFFERENT MORPHOLOGIES, BEHAVIORS, SWIMMING CAPABILITIES, & SEASONAL OCCURRENCES WITHIN THE CAPE FEAR SYSTEM.

SEDBERRY, G.R. AND J.A. MUSICK
NO. 65
1978 FEEDING STRATEGIES OF SOME DEMERSAL FISHES OF THE CONTINENTAL
SLOPE AND RISE OF THE MID-ATLANTIC COAST OF THE USA.
MAR BIOL 44: 357-375.

STOMACH CONTENTS OF 729 FISHES COMPRISING 16 SPECIES WERE EXAMINED FROM THE CONTINENTAL SLOPE & RISE OFF THE MIDDLE ATLANTIC STATES OF THE USA. TWO MAIN FEEDING MODES AMONG DEMERSAL DEEP-SEA FISHES WERE EVIDENT: THOSE FEEDING PRIMARILY ON PELAGIC FOOD ITEMS, & THOSE FEEDING ON BENTHIC INVERTEBRATES. BOTH PELAGIC & BENTHIC PREDATORS WERE EURYPHAGOUS. MOST PELAGIC PREDATORS ALSO FED ON THE EPIBENTHOS. THESE FINDINGS SUPPORT DAYTON & HESSLER'S (1972) SUGGESTION THAT BENTHIC PREDATORS SHOULD HAVE A GENERALIZED DIET WHICH MAY BE RESPONSIBLE FOR THE HIGH DIVERSITY FOUND IN THE DEEP-SEA INFAUNA. THE MESOPELAGIC FAUNA IS AN IMPORTANT FOOD SOURCE FOR SOME DEMERSAL FISHES ON THE CONTINENTAL SLOPE. PELAGIC PREY, WHICH ARE ALSO IMPORTANT TO ECOLOGICALLY DOMINANT DEMERSAL FISHES ON THE LOWER SLOPE & CONTINENTAL RISE, MAY BE NUTRIENTALLY SUPPORTED BY SUSPENDED PARTICULATE ORGANIC MATTER IN A NEPHELOID LAYER CLOSE TO THE BOTTOM, & THEY MAY EXIST IN MUCH HIGHER CONCENTRATIONS THAN IN THE BATHYPELAGIC ZONE ABOVE.

SEDBERRY, G.R. AND MUSICK, J.A.
NO. 79
1979 COMMUNITY STRUCTURE, ANALYSIS AND FOOD HABITS OF FISHES, SECT. I:
FOOD HABITS OF FISHES, VA INST MAR SCI 2-C: CHPT 9, 133 PP
MID-ATLANTIC OUTER CONT SHELF ENVIR STUD

FOOD HABITS OF CONTINENTAL SHELF FISHES WERE EXAMINED. DOMINANT
FISHES WERE LITTLE SKATE, RAJA ERINACEA, GOOSEFISH, LOPHIUS
AMERICANUS, RED HAKE, UROPHYCIS CHUSS, SPOTTED HAKE, UREGIS, SILVER
HAKE, MERLUCCIUS BILINEARIS, OCEAN POUT, MACROZOARCS AMERICANUS,
SCUP, STENOTOMUS CHRYSOAPS, GULF STREAM FLOUNDER, CITHARICHTHYS
ARCTIFRONS, AND FOURSPOT FLOUNDER, HIPPOGLOSSINA OBlonga. BENTHIC
MACROINVERTEBRATES WERE THE PRIMARY FOOD OF THESE DEMERSAL FISHES.*
DIETARY OVERLAP AMONG THE PREDATORS VARIED SEASONALLY.*

SEKAVEC, G. B.

1974 NO. 5 LENGTH-WEIGHT RELATIONSHIP, AND CONDITION FACTOR OF
SUMMER FOODS, LENGTH-WEIGHT RELATIONSHIP, FROM LA. COASTAL STREAMS
JUVENILE LADYFISH, ELOPS SAURUS, SOC. 103(3): 472-476.

A TOTAL OF 295 JUVENILE LADYFISH ELOPS SAURUS LINNAEUS WERE COLLECTED WITH SURFACE TRAWLS FROM LOUISIANA COASTAL STREAMS IN JUNE 1968 & JUNE 1969. THE FISH RANGED FROM 45 TO 201 MM IN FORK LENGTH. OF THE 295 LADYFISH STOMACHS EXAMINED, 229 (77.6%) CONTAINED FOOD. FISH CONSTITUTED 94.5% BY OCCURRENCE OF THE FOOD ORGANISMS & DECAPOD CRUSTACEANS 5.5%. GULFMENHADEN COMPRISED 72.0% OF THE FISH IDENTIFIED. THE CALCULATED LENGTH-WEIGHT RELATIONSHIP FOR JUVENILE LADYFISH IN THE SIZE RANGE 45-201 MM (FORK LENGTH) WAS $\log_{10} W = -5.3295 + 3.1123 \log_{10} L$, & THE MEAN CONDITION COEFFICIENT WAS 8.1.

SHERIDAN, P. F. NO. 69
1978. HABITS OF THE BAY ANCHOVY. ANCHOA MITCHILLI, IN APALACHICOLA
BAY, FLORIDA
NE GULF SCI 2(2): 126-132.

ONTOGENETIC, SPATIAL & TEMPORAL ASPECTS OF THE FOOD HABITS OF THE BAY ANCHOVY, ANCHOA MITCHILLI, WERE EXAMINED IN FISH COLLECTED FROM APALACHICOLA BAY, FLORIDA. CALANOID COPEPODS WERE THE MAJOR CONSTITUENT OF THE BAY ANCHOVY DIET, BUT THEIR IMPORTANCE DECLINED WITH FISH GROWTH AS LARGER ZOOPLANKTTERS SUCH AS MYSIDS WERE CONSUMED. SPECIALIZATION UPON COPEPODS LED TO MODERATE DIETS SIMILARITY AMONG SITES IN THE ESTUARY, EXCEPT IN AREAS NEAR THE MOUTH OF THE APALACHICOLA RIVER WHERE MYSIDS, INSECT LARVAE, & CLADOCERANS WERE MAJOR FOOD ITEMS. COPEPODS WERE THE DOMINANT PREY IN ALL MONTHS BUT WERE MARKEDLY LESS ABUNDANT PREY IN OCTOBER, DECEMBER, & FEBRUARY WHEN OTHER CRUSTACEANS & INSECT LARVAE BECAME RELATIVELY MORE ABUNDANT.

SHERIDAN, P. F.
1979. NO. 12
TROPHIC RESOURCE UTILIZATION BY THREE SPECIES OF SCIAENID FISHES
IN A NORTHWEST FLORIDA ESTUARY
HE GULF SCI 3(1): 1-15.

FOOD HABITS OF ATLANTIC CROAKER (*MICROPOGGONIAS UNDULATUS*), SPOT (*CLEISTOSTOMUS XANTHURUS*), & SAND SEATROUT (*CYNOSCIION ARENARIUS*) WERE EXAMINED IN 1976. COLLECTED ASPECTS OF DIET WERE CONSIDERED. POLY CHAETES WERE MAIN FOOD OF CROAKERS OVER ALL COLLECTIONS. FOLLOWED IN IMPORTANCE BY DETRITUS, FISHES, INSECT LARVAE, MYSIDS, & INFANAL SHRIMP. DIET SPECIALIZATION OCCURRED WITH GROWTH OF CROAKERS, SO THAT ONE OR TWO FOOD TYPES DOMINATED THE DIET. INTRASPECIFIC DIET CORRELATION USING THE SPEARMAN RANK CORRELATION COEFFICIENT, INDICATED THREE FEEDING GROUPS: 10-39 MM FISH, 40-89 MM FISH AND 90-159 MM FISH. CROAKER FEEDING IN SHALLOW, LOW SALINITY SITES IN THE ESTUARY WAS DISTINCT FROM FEEDING IN DEEPER, MORE SALINE AREAS. TEMPORAL ANALYSIS (JANUARY-SEPTEMBER) OF THE CROAKER DIET REFLECTED FOUR FEEDING PATTERNS: (1) FIRST ENTRY INTO THE ESTUARY BY SMALL SIZE CLASSES; (2) AREA-WIDE DISTRIBUTION OF MANY SIZE CLASSES, (3) CONCENTRATION OF MID-SIZE INDIVIDUALS IN THE UPPER ESTUARINE AREAS, & (4) EMIGRATION OF LARGE SIZE CLASSES. POLYCHAETES & HARPACTOID COPEPODS DOMINATED THE AVERAGE SPOTTING DIET, FOLLOWED BY DETRITUS, BIVALVES & NEMATOODES. THE SEVERAL DISTINCTIVE PATTERNS IN FEEDING WERE NOTED ON ONTOGENETIC & SPATIAL BASES BUT NOT ON A TEMPORAL BASIS. INTRASPECIFIC DIET CORRELATION (20-29 MM & LARGEST (100-109 MM) SIZE CLASSES EXAMINED) JUVENILE FISHES (MAINLY ANCHOA (*MITCHILLI*)) DOMINATED THE SAND SEATROUT DIET, WHILE MYSIDS RANKED A DISTINCT SECOND. THERE WAS A CLEAR SEQUENCE OF ONTOGENETIC CHANGES IN SAND SEATROUT FEEDING (ALSO INDICATED BY INTRASPECIFIC CORRELATION), WHEREIN SMALLER SIZE CLASSES PREYED HEAVILY ON MYSIDS FOLLOWED BY A SWITCH TO PISCIVORY BY LARGER INDIVIDUALS. SPATIAL ANALYSIS INDICATED HEAVY CONSUMPTION OF FISHES BY SAND SEATROUT NEAR HIGH SALINITY, PASSING TO THE ESTUARY, GRADING INTO HEAVY CONSUMPTION OF MYSIDS IN SHALLOW, LOW SALINITY AREAS. TEMPORAL ANALYSIS (MAY-NOVEMBER) REVEALED RELATIVELY LOWER PREDATION ON FISHES IN LATE SUMMER WHEN VARIOUS CRUSTACEANS WERE IMPORTANT DIET COMPONENTS.

SHERIDAN, P. F. AND R. J. LIVINGSTON

NO. 11

CYCLIC TROPHIC RELATIONSHIPS OF FISHES IN AN UNPOLLUTED
RIVER-DOMINATED ESTUARY IN NORTH FLORIDA

LIVINGSTON(ED) ECOL PROCES COAST MAR SYST, PLenum Press, NY: 143-161

REGULAR PATTERNS IN SEASONAL OCCURRENCE OF DOMINANT FISHES WERE OBSERVED OVER A SIX-YEAR PERIOD IN THE APALACHICOLA ESTUARY OF NORTH FLORIDA. EXAMINATION OF POTENTIAL PHYSICO-CHEMICAL & BIOLOGICAL COMMUNITY DETERMINANTS HAS LED TO THE HYPOTHESIS THAT TROPHIC RELATIONSHIPS & UNDERLYING PHYSICAL-BIOLOGICAL INTERACTIONS STRUCTURE THIS ESTUARINE FISH COMMUNITY. SIX SPECIES (*ANCHOA MITCHILLI*, *MICROPOGONIAS UNDULATUS*, *LEIOSTOMUS XANTHURUS*, *CYNOSCIUS ARENARIUS*, *BREVIPORTIA PATRONUS*, & *BAIRDIELLA CHRYSSURA*) COMprise 85% OF THE TRAWL-SUSCEPTIBLE FISHES IN THE APALACHICOLA SYSTEM, & EACH IS CHARACTERIZED BY DISTINCTIVE SEASONAL ABUNDANCES & TROPHIC SPECIES. TWO BENTHIC OMNIVORES (*MICROPOGONIAS* & *LEIOSTOMUS*) EXHIBIT HIGH SPATIAL & TEMPORAL OVERLAP BUT DIFFER IN PREY TYPE & SIZE. THESE TWO SPECIES UTILIZE THE ESTUARY SUBSEQUENT TO HIGH RIVER DISCHARGE/DETRITUS INPUT & CONCURRENT WITH MAXIMUM BENTHIC STANDING CROPS. TWO EPIBENTHIC CARNIVORES (*CYNOSCIUS* & *BAIRDIELLA*) ALSO USE THE ESTUARY BUT DIFFER IN TIMES OF PEAK ABUNDANCES & IN PREY TYPES. TWO PLANKTIVORES (*BREVIPORTIA* & *ANCHOA*) ALSO FREQUENT THE ESTUARY BUT DURING DIFFERENT SEASONS (SPRING & FALL, RESPECTIVELY), YET NEITHER COINCURS WITH THE MAXIMUM ZOOPLANKTON STANDING CROP (SUMMER). *ANCHOA* IS PREVENTED FROM DOING SO BY THE PISCIVOROUS *CYNOSCIUS* POPULATION. THUS, REGULAR SEASONAL PROGRESSIONS OF DOMINANT FISHES ARE LINKED TO AVAILABLE TROPHIC RESOURCES COMPETITION, & PREDATION.

SHIPP, R.L.

1979 NO. 10

SUMMARY OF KNOWLEDGE OF FORAGE FISH SPECIES OF MOBILE BAY AND
VICINITY LOYACANO & SMITH(EDS) SYMP NAT RES MOBILE BAY EST, 167-176

FORAGE FISH SPECIES OF MOBILE BAY ARE ASSIGNED TO ONE OF THREE ECOLOGICAL CATEGORIES: 1) NEARSHORE/MARSH, 2) DEMERSAL ESTUARINE, & 3) PELAGIC ESTUARINE. DOMINANT SPECIES OF THE NEARSHORE/MARSH HABITAT ARE LIVEBEARERS (POECILIIDAE), KILLIFISHES (CYPRINODONTIDAE) & SILVERSIDES (ATHERINIDAE). THE FORMER TWO FAMILIES CONTAIN HEAVILY SPECIES, RESISTANT TO CONTAMINANTS, WHILE THE LATTER FAMILY INCLUDES SPECIES EXHIBITING LITTLE RESISTANCE. THE DEMERSAL ESTUARINE SPECIES ARE DOMINATED BY DRUMS (SCIAENIDAE), & LIFE HISTORY DATA ARE AVAILABLE, BUT TOLERANCES TO CONTAMINANTS ARE NOT WELL DOCUMENTED IN THE LITERATURE. THE MOST IMPORTANT FORAGE GROUP IS THE PELAGIC ESTUARINE, DOMINATED BY ANCHOVIES (ENGRAULIDAE) & HERRINGS (CLupeidae). RECENT STUDIES CITING THE PLACE IN THE FOOD CHAIN & DIETARY PREFERENCES FOR THE BAY ANCHOVY ANCHOA MILCHILLI DEMONSTRATE ITS DEPENDENCE ON COMPONENTS OF ZOOPLANKTON. RELATIVE ABUNDANCE TABLES INDICATE THAT WHERE COMPARATIVE DATA ARE AVAILABLE, MOST NORTHERN GULF OF MEXICO ESTUARIES SUPPORT SIMILAR FORAGE FISH FAUNAS. INFORMATION ON EARLY LIFE HISTORY IS RECOGNIZED AS THE MOST CRITICAL NEED FOR THIS GROUP OF FISHES, WHILE INFORMATION ON SPECIES COMPOSITION, SEASONALITY, & OCCURRENCE FREQUENCY APPEARS ADEQUATE. HOWEVER, INDICATIONS OF STRESS ON THE BAY ENVIRONMENT MAY BE RECOGNIZED BY CHANGES IN THESE PARAMETERS.

SIKORA, W.B., R.W. HEARD AND M.D. DAHLBERG
1972. NO.⁹
THE OCCURRENCE AND FOOD HABITS OF TWO SPECIES OF
HAKE, UROPHYCIS REGIUS AND U. FLORIDANUS IN GEORGIA ESTUARIES
TRANS. AM. FISH SOC. 101(3): 513-525.

FROM 1967 TO 1970 A TOTAL OF 2,683 SPOTTED HAKE, UROPHYCIS REGIUS & 470 SOUTHERN HAKE, U. FLORIDANUS WERE COLLECTED & FOUND TO EXHIBIT MIGRATORY PATTERNS IN GEORGIA SIMILAR TO NORTHERN & GULF POPULATIONS OF THESE FISH. THE FOOD HABITS OF INSHORE JUVENILE POPULATIONS OF THESE TWO SPECIES OF HAKE COLLECTED FROM COASTAL SALT MARSH-ESTUARINE AREAS NEAR SAPELO ISLAND, GEORGIA WERE EXAMINED. THE 3341 SPOTTED HAKE & 192 SOUTHERN HAKE EXAMINED CONTAINED IDENTIFIABLE FOOD ITEMS. THESE WERE ANALYZED FOR THE NUMBER OF INDIVIDUAL FOOD ORGANISMS, PERCENT FREQUENCY OF OCCURRENCE, & PERCENT BIOMASS. THE MOST IMPORTANT GROUP IN OCCURRENCE & BIOMASS WAS THE CRUSTACEA WITH MACRURA & NATANTIA MOST IMPORTANT GRAVIMETRICALLY, AMPHIPODA & MYSIDACEA MOST FREQUENTLY OCCURRING. THESE DATA WHEN COMBINED WITH THE HABITS OF THE FOOD ORGANISMS ESTABLISHED THESE TWO HAKES AS SPECIES WHICH USE THE ESTUARY AS "NURSERY GROUNDS."

STICKNEY, R. R.

1976. NO⁸ FOOD HABITS OF GEORGIA ESTUARINE FISHES IN SYMPHURUS PLAGIUSA (PLEUROCENTIFORMES: CYNOGLOSSIDAE) TRANS AM FISH SOC 105(2): 202-207

EXAMINATION OF THE DIGESTIVE TRACTS OF 588 BLACKCHEEK TONGUEFISH, SYMPHURUS PLAGIUSA, DURING 1973 & 1974 INDICATED A PRIMARILY BENTHIC FEEDING HABIT. MOLLUSKS & VARIOUS CRUSTACEANS WERE THE MOST COMMON IDENTIFIABLE CONSTITUENTS OF THE DIET DURING ALL TIMES OF THE YEAR IN FISH OF ALL SIZES ABOVE POSTLARVAE IN BOTH RIVERS & SOUNDS IN GEORGIA ESTUARIES. SAND GRAINS WERE PRESENT IN ABOUT HALF OF THE FISH.

STICKNEY, R.R., G.L. TAYLOR AND R.W. HEARD
1974. NO. 42
FOOD HABITS OF GEORGIA ESTUARINE FISHES I. FOUR SPECIES OF
FLOUNDERS. (PLEURONECTIFORMES; BOTHIDAE)
FISH BULL 72(2): 515-525.

THE FOOD HABITS OF FOUR SPECIES OF BOTHID FLOUNDERS FROM COASTAL WATERS WERE EXAMINED BY MEANS OF STOMACH CONTENT ANALYSES: OCCELLATED FLOUNDERS, *ANCYLOPSETTA QUADROCELLATA* (GILL); BAY WHIFF, CICHLARICH THYSPILOPTERUS (*CUNTHIER*); & WINDOWPANE, *SCOPHTHALMUS AGUOSUS* (MITCHILL) FED HEAVILY ON THE MYSID SHRIMP, *NEOMYSIS AMERICANA*, WITHOUT REGARD TO SEASON OF THE YEAR OR LOCATION WITHIN THE ESTUARY. THE FOOD HABITS OF BOTH A. QUADROCELLATA & C. SPILOPTERUS CHANGED TO SOME EXTENT AS THE FISH BECAME LARGER. ORGANISMS LARGER THAN *N. AMERICANA* DOMINATED THE STOMACH CONTENTS OF A. QUADROCELLATA LARGER THAN 150 MM STANDARD LENGTH & C. SPILOPTERUS LARGER THAN 125 MM. S. *AQUOSUS*, IN THE SIZE RANGE EXAMINED, MOST EXCLUSIVELY ON N. *AMERICANA*. FRINGED FLUNDER, *ETROPLUS CROSSOTUS* (*JORDAN & GILBERT*) PRIMARILY CONSUMED THE CALANOID COPEPOD, *PSEUDODIAPTOMUS CORONATUS*, DURING THE SPRING, SUMMER, & FALL AND DIVERSIFIED THEIR FOOD HABITS DURING THE WINTER. *P. CORONATUS* DOMINATED THE STOMACH CONTENTS BOTH IN THE RIVERS & SOUNDS OF GEORGIA ESTUARINE WATERS & WAS THE DOMINANT ORGANISM IN FISHES OF ALL SIZES UP TO 100 MM WHEN POLYCHAETE ANNELIDS BECAME IMPORTANT. THE FOOD OF *E. CROSSOTUS* DID NOT APPEAR TO VARY WITH TIME OF DAY; HOWEVER, *E. CROSSOTUS* DID NOT ACTIVELY FEED AT NIGHT. THE DIFFERENCE IN FOOD HABITS BETWEEN *E. CROSSOTUS* & THE OTHER THREE BOTHID SPECIES APPEARS TO BE ASSOCIATED WITH THE RELATIVE SIZE OF THE MOUTH.

STICKNEY, R. R., G. L. TAYLOR AND D. B. WHITE
1971. NO. 43 SPECIES OF YOUNG SOUTHEASTERN UNITED STATES
FOOD HABITS OF FIVE SPECIES OF YOUNG SOUTHEASTERN UNITED STATES
ESTUARINE SCIENIDAE
CHESAPEAKE SCI 16(2): 104-114

THE FOOD HABITS OF FIVE SPECIES OF THE FAMILY SCIENIDAE,
BAIRDIELLA CHRYSSURA, CYNOGLOSSUS REGALIS, LEIOSTOMUS XANTHURUS,
MICROPOGON UNDULATUS & STELLIFER LANCEOLATUS, WERE EXAMINED IN
SPECIMENS OF LESS THAN 200 MM STANDARD LENGTH COLLECTED IN
ESTUARIES BETWEEN GEORGETOWN, SOUTH CAROLINA, & JACKSONVILLE, FL.
B. CHRYSSURA, M. UNDULATUS & S. LANCEOLATUS DID NOT APPEAR TO BE
HIGHLY SELECTIVE IN THEIR FOOD HABITS; C. REGALIS FEED HEAVILY ON
THE MYSID SHRIMP, NEOMYSIS AMERICANA, & ON FISH; & L. XANTHURUS
WAS SELECTIVE TOWARD HAPACTICOID & CALANOID COPEPODS. THE FOOD
HABITS OF THE FIVE SPECIES OF FISH EXAMINED WERE RELATIVELY
CONSTANT WITH SEASON & LOCATION WITHIN THE ESTUARY; HOWEVER, IN
GENERAL, LARGER FOOD ORGANISMS WERE CONSUMED AS THE SCIENIDS IN
CREASED IN SIZE. THE EXCEPTION WAS L. XANTHURUS WHICH MAINTAINED
THE SAME FOOD HABITS AT ALL SIZES EXAMINED.

STONER, A.W. NO. 3
1980; FEEDING ECOLOGY OF LAGODON RHOMBOIDES (PISES: SPARIDAE):
VARIATION AND FUNCTIONAL RESPONSES
FISH BULL 78(2): 337-351.

FIVE MAJOR ONTOGENETIC STAGES WERE FOUND IN THE DIET OF PINFISH,
LAGODON RHOMBOIDES, FROM APALACHEE BAY, FLORIDA, BUT DIET &
DIETARY BREATH SHOWED HIGH DEGREES OF VARIATION WITH SPACE (BOTH
LOCAL & GEOGRAPHIC), & SEASONAL VARIATION WITHIN SIZE CLASSES WAS
OFTEN AS DRAMATIC AS ONTOGENETIC VARIATION. LAGODON RHOMBOIDES
DEMONSTRATED PLANKTIVORY, OMNIVORY, STRICT CARNIVORY,
HERBIVORY AT DIFFERENT TIMES, & DEVELOPMENTAL STAGES.
ONTOGENETIC PATTERN IN FOOD HABITS WAS PRIMARILY A FUNCTION OF
MOUTH SIZE & CHANGING DENTITION OF THE PREDATOR UNTIL IT REACHES
35 MM STANDARD LENGTH, THE PINNIFISH IS AN OBLIGATE CARNIVORE.
A COMPLEX FUNCTION OF ABSOLUTE & RELATIVE ABUNDANCES OF FOOD ITEMS
IN THE FIELD CHANGES IN PLANT CONSUMPTION BY FISH LARGER THAN 35
MM STANDARD LENGTH MAY BE DUE TO CHANGING PLANT ABUNDANCE OR PRO-
JECTION OF PREY SPECIES BY MACROPHYTE COVER AT A GIVENS STATION.
SINCE SEA GRASS BIOMASS & THE FUNCTIONAL ROLE OF A SINGLE PREDATOR
SHIPS CHANGE CONTINUALLY; HOWEVER, THE LIFE HISTORY OF RHOM-
BOIDES IS WELL ADAPTED TO SEASONAL PATTERNS OF PRODUCTIVITY IN
FOOD ORGANISMS. MULTIDIMENSIONAL VARIATION IN DIETS RENDERED THE WEBS
TROPHIC LEVEL CONCEPT INOPERATIONAL. IT IS INCLUDED THAT FOOD WEBS
ARE STATIC NEITHER IN TIME NOR IN SPACE & THAT TAXONOMIC SPECIES
& PREDATOR-PREY RELATIONSHIPS.

TARGETT, T.T. NO. 40
1978. FOOD RESOURCE PARTITIONING BY THE PUFFERFISHES *SPHOEROIDES*
SPENGLERI AND *S. TESTUDINEUS* FROM BISCAYNE BAY, FLORIDA
MAR BIOL 49: 83-91

PARTITIONING OF THE FOOD RESOURCES BY TWO COEXISTING PUFFERFISHES (*SPHOEROIDES SPENGLERI* & *S. TESTUDINEUS*) FROM BISCAYNE BAY, FL., USA, WAS INVESTIGATED. GUT CONTENTS FROM 453 BANDTAIL & 339 CHECKERED PUFFERS WERE ANALYZED. THE DIETS OF BOTH SPECIES CONSISTED OF A VARIETY OF BENTHIC PREY, BUT ONLY CRUSTACEANS & MOLLUSCS WERE IMPORTANT PREY GROUPS. WHILE DIFFERENCES WERE FOUND IN THE PROPORTIONS OF GENERAL PREY CATEGORIES EATEN BY THESE FISHES, BOTH SPECIES CONSUMED SUBSTANTIAL QUANTITIES OF BRACHYURAN CRABS, BIVALVES, & GASTROPODS. SPECIFIC IDENTIFICATION OF THE PREY ITEMS WITHIN THESE THREE FOOD CATEGORIES REVEALED ADDITIONAL DIFFERENCES IN PREY BETWEEN THE TWO PUFFER SPECIES. THIS PARTITIONING OF THE FOOD RESOURCES BY BANDTAIL & CHECKERED PUFFERS WAS FOUND BETWEEN BOTH SPECIES OVERALL, BETWEEN OVERLAPPING SIZE RANGES, & BETWEEN BOTH SPECIES. MOST ABUNDANT SIZE GROUP DIFFERENCES IN FOOD HABITS BETWEEN THESE TWO FISHES ILLUSTRATE THAT CONGENERS WITH VIRTUALLY IDENTICAL MOUTH STRUCTURE & COMPLETE SPATIAL OVERLAP CAN SIGNIFICANTLY PARTITION THE FOOD RESOURCES.

MYER, G.W., S.M. ADAMS AND M.W. LACROIX
NO. 39
STRUCTURAL AND FUNCTIONAL ASPECTS OF A RECENTLY ESTABLISHED
INTERA MARINA COMMUNITY
FRONIN, L.E. (ED) ESTUARINE RES, ACADEMIC PRESS 1:518-541

ALTHOUGH THE VALUE OF EEL-GRASS PRODUCTIVITY TO AN ECOSYSTEM HAS BEEN RECOGNIZED FOR OVER 50 YEARS, LITTLE QUANTITATIVE INFORMATION IS AVAILABLE ON ANY MAJOR PORTION OF THE EEL-GRASS COMMUNITY IN NORTH AMERICA, SAVE FOR ON THE GRASS ITSELF. THE EPIFAUNAL & INFRAUNAL INVERTEBRATES & THE FISHES INHABITING A GRASS BED IN THE NEWPORT RIVER ESTUARY ARE DOMINATED BY ONLY A FEW SPECIES. THE DENSITY & BIOMASS OF THESE GROUPS ARE CONSIDERABLY GREATER THAN IN THE ADJACENT UNVEGETATED PORTIONS OF THE ESTUARY. FISHERIES USING THE GRASS BED APPEARED TO EXACT SOME CONTROL OVER THE DENSITY OF THE EPIFAUNAL COMMUNITY. THE MACROFAUNA IN THE BED CONSUME AN AMOUNT OF ENERGY EQUIVALENT TO 55% OF THE NET PRODUCTION OF EEL-GRASS, PHYTOPLANKTON, & BENTHIC ALGAE IN THE BED. THERE IS SUFFICIENT AVAILABLE ENERGY TO SUPPORT THE ESTIMATED BACTERIA-MICROFAUNA-MEIOFAUNA COMPARTMENT. THE DATA FURTHER SUGGEST THAT THERE IS AN EXCESS OF PLANT PRODUCTION IN THE BED, A PORTION OF WHICH IS INCREASING THE ORGANIC CONTENT OF THE SEDIMENTS. THE REMAINDER IS PROBABLY EXPORTED TO THE ADJOINING ESTUARY. THIS EXPORT MAY BE HIGHLY SIGNIFICANT TO THE TROPHIC FUNCTION OF THE SHALLOW ESTUARINE SYSTEM NEAR BEAUFORT, SINCE EEL-GRASS IS ESTIMATED TO SUPPLY AS MUCH AS 64% OF THE TOTAL PRODUCTION OF PHYTOPLANKTON, CORD GRASS & EEL-GRASS IN THIS SYSTEM.

TOOLE, J. E.
1971. NO. ⁴ FOOD STUDY OF THE BOWFIN AND GARS IN EASTERN TEXAS PARKS AND WILDLIFE DEPT., MARSHALL, TX 6:1-14
TECH SERIES, TEXAS PARKS AND WILDLIFE DEPT.

DURING THE FIVE YEAR PERIOD OF THIS STUDY, 1,514 GAR & BOWFIN STOMACHS WERE COLLECTED & EXAMINED. SPOTTED GAR (*C. OSSEUS*) & BOWFIN (*C. CUMULATUS*) WERE EVALUATED AS PREDATOR SPECIES IN THE BOWFINS OF EAST TEXAS. PLATOSTOMUS WERE INSUFFICIENT DATA WHERE COMPILED FOR THE DETERMINE ITS VALUE AS A PREDATOR. ANALYSIS INDICATES THE ALLIGATOR & SHORTHORN GAR (*C. PLATOSTOMUS*) ARE MORE SPECIFIC FORAGE FISH PREDATORS THAN THE SPOTTED GAR OR THE BOWFIN. ALL OF THE SPECIES STUDIED CONSUMED SPOTTED GAR OR THE BOWFIN. THE GROWNAGES IN THE GIVEN WATERS THAN CAN BE ATTRIBUTED TO NON-SELECTIVE FEEDING HABITS DEPENDENT ONLY ON FOOD AVAILABILITY.

WEINSTEIN, R. W. NO. 62
THE IMPORTANCE OF PREDATION BY CRABS AND FISHES ON BENTHIC INFAUNA
IN THE CHESAPEAKE BAY
ECOLOGY 5(2): 1199-1217

VIRNSTEIN, R.W.

1978. NO. 63

PREDATOR CAGING EXPERIMENTS IN SOFT SEDIMENTS: CAUTION ADVISED
WILEY, M.L. (ED) ESTUARINE INTERACTIONS ACADEMIC PRESS, INC.: 261-273

FIELD EXPERIMENTS IN WHICH PREDATORS WERE EXCLUDED FROM SOFT-SEDI-
MENT COMMUNITIES HAVE BEEN DONE IN THE YORK RIVER, VIRGINIA, THE
INDIAN RIVER, FLORIDA, & THE SHALLOW CONTINENTAL SHELF OFF SOUTH
EAST FLORIDA. THE YORK RIVER EXPERIMENTS REVEALED THAT PREDATORS
ON INFANAL MACROBENTHOS ARE IMPORTANT IN DETERMINING COMMUNITY
STRUCTURE & POPULATION DENSITIES. THERE APPEARED TO BE ONLY TWO
MAJOR PREDATORS IN SHALLOW WATER - THE BLUE CRAB CALLINECTES
SAPIDUS (CRUSTACEA: PORTUNIDAE) & THE SPOT LEIOSTOMUS XANTHURUS.
(PISES: SCIAENIDAE). THE SAME EXPERIMENTS IN THE INDIAN RIVER, A
COASTAL LAGOON, SHOWED NO DIFFERENCES IN INFAUNAL DENSITIES INSIDE
& OUTSIDE EXCLOSURES. THE DIFFERENCES BETWEEN RESULTS IN THE TWO
GEOGRAPHIC AREAS ARE ATTRIBUTED TO THE GREATER ABUNDANCE IN THE
INDIAN RIVER OF SMALL DECAPOD PREDATORS WHICH WERE NOT EXCLUDED BY
THE CAGES. THESE DECAPOD PREDATORS ACTUALLY INCREASED IN ABUNDANCE
IN EXCLOSURES. PRELIMINARY RESULTS FROM EXPERIMENTS ON THE SHALLOW
SANDY SHELF INDICATE THAT DECAPODS & FISHES ARE PROBABLY IMPORTANT
HERE ALSO AS PREDATORS ON THE MACROFAUNA. ONE MUST NOT ASSUME THE
ONLY EFFECT OF CAGING TO BE PREDATOR EXCLUSION OR INCLUSION. CAGES
MAY ALTER THE PHYSICAL ENVIRONMENT OR ATTRACT LARGE PREDATORS;
CAGING STUDIES MUST BE CAREFULLY PLANNED & CAUTIOUSLY INTERPRETED.
THIS PAPER REVIEWS PROBLEMS OF CAGING EXPERIMENTS ENCOUNTERED IN
THE DESIGN, FIELD, & INTERPRETATION STAGES. CONSIDERATION OF ALL
THESE POTENTIAL PROBLEMS IS A NECESSITY FOR A SUCCESSFUL CAGING
EXPERIMENT.

VIRNSTEIN, R.W. NO. 64
1979 PREDATION ON ESTUARINE INFRAUNA: RESPONSE PATTERNS OF COMPONENT
SPECIES ESTUARIES 2(2): 69-86.

THE EFFECT OF PREDATION BY BLUE CRABS & FISHES ON ALL SPECIES OF INFRAUNAL MACROBENTHOS OF A SUBTIDAL SANDY BOTTOM IN THE YORK RIVER VIRGINIA, WAS INVESTIGATED BY MANIPULATIVE FIELD EXPERIMENTS. WIRE MESH CAGES WERE USED BOTH TO EXCLUDE ALL LARGE PREDATORS FROM & TO CONFINED DIFFERENT PREDATORS TO SMALL AREAS OF THE NATURAL BOTTOM. AFTER 2 MONTHS, MANY SPECIES SHOWED SIGNIFICANT DIFFERENCES BETWEEN THE VARIOUS TREATMENTS. THERE WERE SIMILAR PATTERNS OF FIT SPECIES RESPONSES IN THREE SEPARATE YEARS. SPECIES TENDED TO FIT ONE OF TWO CATEGORIES. THOSE SPECIES WHICH HAD TOUGH TUBES, WHICH LIVED DEEP IN THE SEDIMENT, OR WHICH COULD QUICKLY RETRACT, DEEP INTO THE SEDIMENT WERE SHOWN EXPERIMENTALLY NOT TO CHANGE MUCH IN ABUNDANCE REGARDLESS OF WHETHER PREDATORS WERE EXCLUDED OR INCLUDED. THESE SPECIES WERE GENERALLY THE NUMERICAL DOMINANTS IN THE NATURAL COMMUNITY--E.G. PELOSOCLEX GABRIELLA, HETEROMASTUS FILIFORMIS, SPIOCHAE TOPERUS OCULATUS, & PHORONIS PSAMMOPHILA. OTHER SPECIES WHICH LIVED NEAR THE SURFACE OR EXPOSED ON THE SURFACE RESPONDED TO EXPERIMENTALLY ALTERED PREDATION INTENSITY WITH LARGE CHANGES IN DENSITY. THESE SPECIES WERE EITHER UNCOMMON OR ONLY SPORADICALLY ABUNDANT IN THE NATURAL COMMUNITY--E.G. POLYDORA LIGNI, STREBLOSPIO BENEDICTI, MULINIA LATERALIS, & LYONSIA HYALINA. THIS EVIDENCE INDICATES THAT THE ABUNDANT SPECIES IN THE NATURAL COMMUNITY ARE ABUNDANT BECAUSE THEY AVOID PREDATORS.

WENNER, C.A., MUSICK, J.A.

NO. 38

FOOD HABITS AND SEASONAL ABUNDANCE OF THE AMERICAN EEL, ANGUILLA
ROSTRATA, FROM THE LOWER CHESAPEAKE BAY.

1975.

SCI

16(1): 62-66

FOOD HABITS & SEASONAL ABUNDANCE OF THE AMERICAN EEL, ANGUILLA
ROSTRATA (LESUEUR), WERE STUDIED FROM THE BRACKISH WATER REGIONS
OF THREE VIRGINIA RIVERS. ABUNDANCE IN TRAWL SURVEYS WAS RELATED
TO WATER TEMPERATURES WITH FEWER EELS BEING CAUGHT DURING THE
COLDER MONTHS. POLYCHAETES, CRUSTACEANS & BIVALVES WERE THE MOST
IMPORTANT DIETARY ITEMS OF A PROSTRATA IN BRACKISH WATER. THERE
WAS MUCH PREDATION ON THE COMMERCIALLY IMPORTANT SPECIES MYA ARE
NARIA & CALLINECTES SAPIDUS.

WORD, J. Q.
NOV. 7⁹
A PROPOSED INFANAL INDEX - A RELATIVE ABUNDANCE MEASURE OF THE BENTHIC
INFANAL FAUNA AND HOW IT MAY BE APPLIED TO FISH FOOD HABITS
PROC 2ND PACIFIC NW WKSHP, WA: 37-42
SHEVCHENKO & SVERDLOVSKY

A METHOD IS PROPOSED IN THIS PAPER WHICH MAY PROVIDE A RAPID,
SIMPLIFIED AND ACCURATE INDEX FOR ASSESSING THE FEEDING HABITS OF
FISH SPECIES AS WELL AS PROVIDING SOME MEANS
OF ESTIMATING THE OVERLAP IN MULTISPECIES FISHERIES. IT IS A
METHOD WHICH HAS BEEN
DEVELOPED FOR ASSESSING THE BENTHIC FAUNAL COMMUNITIES WHICH HAS BEEN
INTERPRETED FOR THE SOUTHERN CALIFORNIA COASTAL SHELF. A
DESCRIPTION OF THE INDEX AND ITS APPLICATION TO FISH
FOOD HABITS.

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Clarke, Douglas G.
Feeding habits and food of the fishes of Mississippi Sound and adjacent coastal areas ; a bibliography with abstracts / by Douglas G. Clarke, Harry L. Horstmann (Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station). -- Vicksburg, Miss. : The Station ; Springfield, Va. : available from NTIS, 1981.
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1. Coastal ecology. 2. Fishes. 3. Invertebrates.
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II. United States. Army. Corps of Engineers. Mobile
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